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PORT MANUFACTURING: A STUDY OF HAMILTON'S BAYFRONT INDUSTRIAL AREA

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PORT MANUFACTURING: A STUDY OF HAMILTON'S BAYFRONT INDUSTRIAL AREA

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Abstract

An analysis of port-city linkages at the industrial port of Hamilton reveals that the primary steel industry has dominated tonnages and has induced major port expansions. The expansion of the steel companies within an inner city area was made possible by land reclamation schemes on the bayfront. The oligopolistic land ownership that evolved perpetuated dominance in the bayfront industrial area and port activity. Today, spatial limitations and urban diseconomies are causing the decentralization of industries. Prospects for progressive development of the bayfront area rest with the steel companies rather than the port because the locational attraction of the port is insignificant to most firms today. However, oligopolistic land ownership may induce undesirable development by disregarding the needs of smaller firms, diversified industries and alternative land uses.

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Chapter I
INTRODUCTION

The purpose of this paper is to examine why Hamilton is the only major port in Canada where manufacturing is still overwhelmingly the dominant activity on the central waterfront. The Port of Hamilton has a unique history of continuous industrial growth and a lack of inner city decentralization which is evident in other older established cities. It is the thesis of this paper that interrelationships between the port and the bayfront industrial area have brought about this anomalous occurrence. The most significant factor in the port's success has been the ability of the two major steel companies located in the bayfront industrial area -- Stelco and Dofasco -- to expand progressively within the same neighbourhood during their seventy years of existence. The central problem in this study is, therefore, to identify the very special set of processes that have resulted in this continued industrial expansion on the central waterfront. Once this is resolved, a second problem is addressed. Given the set of processes that enabled inner city industrial expansion and staved off decentralization pressures, what would be the future prospects for growth if these processes were terminated?

The study of ports is fascinating because historically they have been an important factor in city formation. As trading patterns became established, the port, being a break-of-bulk point, offered transport cost advantages for the location of economic activities. Consequently, industry, services and people began to agglomerate adjacent to these shipping operations. More recently, the port's role has been reverting from one of city formation to that of providing a transshipment function between its foreland and its hinterland.

Any discussion of contemporary Canadian ports should address the issue of changing port functions and the redevelopment of traditional port areas. Changing port functions have physically altered the activities, operations and land uses of our harbours and in many cases have resulted in a spatial decentralization of the 'port' from the inner city. In Burrard Inlet, the Vancouver waterfront has witnessed declining employment in port industries, while the suburban Lower Fraser River attracts new industries and Roberts Bank is increasingly utilized for coal exports. In Montreal and Halifax, demands for port expansion and urban diseconomies have caused the decentralization of port activities while older port areas are undergoing urban redevelopment. In Toronto, declining cargo trade has enabled recreational, residential and commercial uses to compete for waterfront property. However, on the central bayfront of Hamilton, raw material stockpiles, belching smokestacks, blast furnaces and rolling mills line the harbour, overshadowing other port activities and suppressing alternative waterfront land uses.

The following describes the framework used in this paper to reach the final interpretations, recommendations and conclusions.

Chapter two is an extended definition of the problem which combines a review of theoretical stages of port development with actual port trends in Canada. It examines the historical functions of ports and identifies their changing roles in Canadian port cities. The port of Hamilton is expected to exhibit a lack of conformity to port trends. This is the problem investigated in this paper -- in other words, how have heavy industrial port activities maintained their dominance in Hamilton while other major North American cities have experienced decline and decentralization of the inner city port and industrial activity. The problem not only requires the comprehension of industrial port processes, but also the economic and social problems of inner city industrial areas.

The research strategy utilized in this case study is discussed in chapter three. The first step involves the definition of port and industrial activities to enable the delimitation of a study area. Second, the survey techniques and questionnaire design are critically examined in some detail. Lastly, the data collection process and the analytical techniques used for data computation are reviewed.

In chapter four, Hamilton's anomalous industrial growth in the bayfront area is explained. This is accomplished by studying port activities and their links with adjacent industries, particularly the steel industry. Subsequently, the problem is reformulated to ascertain how the steel companies achieved unparalleled growth within an inner city location. The principal causal factor to be examined is the evolution of imperfect competition in the land market which permitted industrial spatial expansion and eliminated competing land uses.

Having identified the processes leading to continuous industrial development of the central waterfront, chapter five evaluates the growth potential of the bayfront area when conventional methods of land acquisition are abrogated. This is approached by analyzing land requirements of firms and identifying the decentralization pressures that are evident. The significance of industrial decentralization is then related to the lack of diversification and the loss of local linkages within the steel complex. This is postulated as an undesirable consequence of the steel companies' oligopolistic control of the bayfront area.

In chapter six, recommendations are made concerning municipal planning for the bayfront area and for the harbour itself. Primary consideration is given to the removal of oligopolistic competition in the land market. The role of the Hamilton Harbour Commissioners (H.H.C.) may be substantial because they own the remaining

undeveloped waterfront property. In conclusion, the more important findings of this paper are drawn together, and suggestions for further study are considered.

Chapter II
EXAMINING INDUSTRIAL PORT DEVELOPMENT PROCESSES

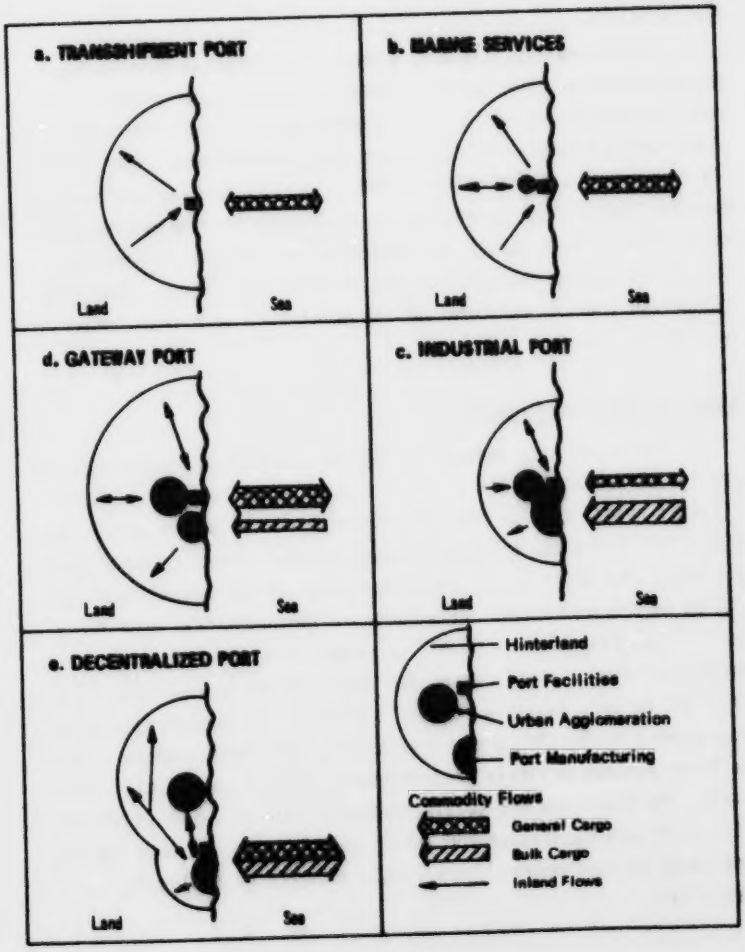
Introduction

Historically, the port played a significant role in the establishment of many Canadian towns. However, ports have since been segregated increasingly from urban activities. Port functions have diminished in importance and, subsequently, port activity on central waterfronts of Canadian port cities has declined or decentralized. Port manufacturing activities have been especially vulnerable to such trends and have been responsible for drastic changes in employment and land use in older port areas. The Port of Hamilton, which has retained the appearance of a traditional port is an anomaly.

Stages of Port Development

"To serve as a gateway to the industrialized hinterland, to provide an outlet for its products and an inlet for the raw materials it needs, that is the main function of the modern port" (Oram, 1965, 1). Ports can progress through several stages of development; yet ports can exist at any stage depending on the demands and activities of the hinterland (Figure 1). The commercial need for a port is generated when a market or demand area requires a resource or product from a supply area, and where marine transportation is the best or only feasible mode of transport. A coastal site which possesses a navigable, protective harbour with land transport connections becomes a likely transshipment point (Figure 1,a). Initially the functions are solely transport related, such as the provision of port facilities and inland connections. At this incipient stage of development, very little commerce or employment is generated.

Figure 1
STAGES OF PORT DEVELOPMENT



As the cargo trade increases at the transshipment point, the provision of specialized services for shipping operations and cargo handling becomes a feasible proposition. Storage facilities and warehousing activities are undertaken to stockpile and redistribute cargo. This eliminates the need for land connections to coincide perfectly with ship arrivals and also permits smaller units to be carried inland. Meanwhile, the majority of the manpower for loading and unloading vessels is provided at the port by stevedores. Other services include: ship maintenance; port management; navigation aids such as lighthouses, pilotage in harbours and dredging of channels; and the supply of goods and services to inbound vessels and crews. These port activities often provide the impetus for marine industry servicing the port and inbound vessels. Examples include shipbuilding and repair, marine engineering, dredging, pile driving, and the manufacture and distribution of marine supplies. The resulting agglomeration of terminal services at the port creates commerce and employment for a permanent settlement (Figure 1,b).

The economics of bi-modal transportation state that a location at an intermediate terminal (e.g., the port) will avoid one terminal charge and can possibly provide a least-cost location (Nourse 1968,78; Weber 1929). Consequently, ports have the potential to attract industries that utilize marine transportation for a major proportion of their inputs and/or outputs. These tend to be industries that require large quantities of materials which are heavy or bulky in relationship to their value, because waterborne transport is the cheapest and most efficient mode, and transshipment costs of these cargoes are high. Examples include primary iron and steel making, food processing, forest products, metal smelting and petroleum refining. Industries that use an abundance of fuel, such as thermal power generating, are also likely to benefit from a port location. Most of these industries also

require large amounts of water for industrial processes, thereby reaffirming the selection of a port location. Basic industries create localization economies for related activities in the metal, petro-chemical, wood and paper products sectors. The multiplier effects of this direct and indirect port employment generates an urban centre. If this local centre is the major contributor to port activity, it is referred to as an industrial port (Figure 1,c). Other ports may generate local port industry, but they still perform a gateway function for a regional or national hinterland. These have been termed gateway ports (Figure 1,d).

As the port-city grows into a major industrial and commercial centre, the port's significance as a locational factor declines relative to the importance of urban agglomeration and localization economies. Some firms may be active in international trade, but they do not require direct port access for their commodity inputs or outputs. The majority of firms in the city are likely to serve local or regional markets and have no port requirements. The most recent stage of port development is caused by the incompatibility of port activity with inner city development. The result has been the decentralization of modern port activities (Figure 1,e). The reasons for this last stage are a central theme of this paper and are specifically dealt with later in this chapter.

Historical Antecedents

In Europe, ports have played a significant role commencing with early commercial trade routes, through colonization, and into the industrial revolution. Major urban centres and industrial complexes relied on a port location for overseas raw materials and exports of finished goods to lesser developed nations. Today, most of the major cities of the world are ports.

Prior to European settlement, Canada had a simple economic structure. However with colonization from overseas, ports naturally became essential as a means of transporting people and supplies to the new colony. Several of the early ports grew into urban centres because economic activity was tied to Europe during the initial stages of economic growth. As settlement moved to the interior of the country, primary products were processed and exported via ports. This activity helped to stimulate the regional economies. By 1900, all major urban centres in Canada, except Winnipeg, were ports.

Hamilton exemplified the importance of a port location for city formation during nineteenth century Canada. In the early 1800's, it was the town of Dundas that required a water connection at the western end of Lake Ontario because the existing roads made it impossible to transport large quantities of supplies. Unfortunately, the Desjardins Canal, which connected Dundas to Burlington Bay, soon proved too small and restrictive for the potential industrial growth of the town. Consequently, the tiny settlement that became Hamilton served as an entrepôt for Dundas because it was situated on Burlington Bay. Soon it was obvious that this bayfront site, combined with the building of the Great Western Railroad, offered superior opportunities for industry. Hamilton outgrew Dundas and became the major generator of trade, but it never developed a large hinterland due to competition with Toronto in central Ontario, and the Welland Canal provided an alternative access route to south-western Ontario.

The late 1800's was a period of industrial growth in Ontario, partly as a result of British and then American investment, and partly from the reinvestment of domestic profits in agriculture and mining in manufacturing. Industries were concentrated in the major urban centres, and the creation of jobs attracted large numbers of

immigrants which expanded the population of cities. Industrialization was founded on import substitution, and consequently most of the output was destined for domestic consumption. The initial focus was on primary industries such as food and beverages, textiles, primary metals and wood products. A port location often proved advantageous since many manufacturers required inputs of overseas or domestic raw materials which were best transported by water.

The construction of railroads initially benefited ports because rail terminals were usually situated adjacent to waterfronts in major cities. However, rail transport provided competition to coastal shipping. In areas with a good rail network, such as Ontario, the redistribution of cargo inland by rail permitted waterborne trade to be concentrated at fewer ports. The railroads also reduced waterborne shipments of domestic cargoes, with the exception of bulk cargoes. In Toronto, the major urban-industrial centre and inland port, the railroads lessened the dependency of industry on port activities, which permitted outward expansion of firms from the congested port area.

"Between 1871 and 1911, Hamilton's population grew from 26,717 to 86,969, ... similarly, employment in manufacturing increased from a mere 4,456 to 21,149" (Middleton and Walker, 1980, 2). The Hamilton area possessed several locational advantages for industry, including good rail and water transportation, a cheap source of electrical energy, access to Canadian and American markets, an industrial water supply, and plentiful land on the bayfront. Still, industrial growth was moderate compared to Toronto because Hamilton lacked a large hinterland to spur locally based industrial development. This all changed in the 1890's when several iron foundries located in the bayfront area, making Hamilton a national centre for primary iron and steel. "When one looks at the major reason for the location of the blast furnace in Hamilton

in 1896, however, it is found that a considerable inducement was needed by the City Council" (Walker and Bater 1974, 52). "These decisions were influenced to a large extent by the local council's generosity in providing of a free site for the plant, a long term exemption from local taxes, and a cash payment if expansion proceeded at a rate determined by the city" (Kerr 1971, 62). The forward linkages of the steel industry generated localization economies for other national companies, many of which were American subsidiaries. Examples included Westinghouse, International Harvester, Otis Elevator, American Can, Stanley Steel, Boston Insulated Wire and True Temper. As Hamilton became a prominent industrial centre, a diversity of industries were also attracted such as Domglas, Procter and Gamble, Norton and Firestone.

After this industrial boom, the primary iron and steel works remained the major port users due to huge raw material requirements. However, port activity thrived as two of these operations evolved into giant companies. The successful amalgamation of six companies by 1910 culminated in the Steel Company of Canada, which instantly became Canada's largest integrated steel works. Two years later, Dominion Foundries and Steel was founded, although it did not become an integrated operation until the 1940's. Today, they are the country's two largest steel companies, producing 60 per cent of domestic steel output at their Hamilton operations.

Both steel companies were originally located directly on the waterfront, which, at the time, was vulnerable to flooding. The construction of dockwalls served the dual purpose of receiving waterborne shipments and reclaiming marginal land. The demands for space increased rapidly since growth not only entailed the provision of new steel-making facilities, but also required additional land to stockpile larger quantities of raw materials. The

problem of growing requirements for outside storage was enhanced further by the winter restrictions on shipping.

An integrated steel operation involves the movement of millions of tonnes of primary steel between the steel-making facilities and the various finishing mills; therefore, it is very advantageous to keep operations spatially concentrated. Since the bayfront industrial area has been fully occupied, the value of property adjacent to the steel companies has inflated beyond the reach of other industries (unless they also require adjacent land for expansion). Land development processes have permitted the steel companies to occupy half the industrial property in the bayfront area. This duopolistic ownership has perpetuated imperfect competition for land, resulting in an unexpected pattern of land uses on the central waterfront.

Port Development Trends in Canada

Change is certainly the unifying theme in Canadian ports over the last twenty-five years. Slack (1978) determined five common changes that Canadian ports have undergone: new foreland relationships; changing hinterlands; new port functions; new port sites; and cargo tonnage. "Ports require a great adaptability to change because their position as an interface between inland and maritime transport systems makes them highly vulnerable to external changing influences" (Little 1973, 92). This paper analyzes four key factors that have influenced the appearance and functions of Canadian ports. These are: changing trade patterns, tonnages and cargo types; declining port manufacturing activities, particularly in the older port areas; increasing land competition from non-traditional waterfront uses; and declining direct employment in port operations. These factors are inter-related, as the following discussion demonstrates.

1) Changing Trade Patterns, Tonnages and Cargo Types

Shipping patterns, tonnages and cargo types are a function of locational demands, supply and shipping technology. The location of domestic demand over time has been fairly constant because Canada's markets have long been centred in Montreal, the Toronto-Hamilton area and Vancouver. Foreign markets have also been relatively stable due to Canada's dependence on the United States and northern European countries for trading partners. A major exception is the growing oriental demand for coal and grain which has significantly benefited West Coast ports. However, changes in domestic demand 'points' have altered somewhat as a result of recent industrial port installations at Port Hawkesbury, Contrecoeur, Becancour and Nanticoke. These 'greenfield' sites are simply intermediate demand points for existing market areas, but they have affected shipping patterns. Total demand for shipping has increased, although most growth has been in the area of exported bulk cargoes, which must offset inflated costs of imported finished goods.

Supply often displays a point distribution and can vary readily as non-renewable resources (such as iron ore deposits in Northern Ontario) are depleted and new resources (such as Labrador ore and Western Canadian coal) are exploited. The alteration of these supply points and the quantities demanded has had a substantial effect on the trade of such ports as Thunder Bay, Sept Iles, Port Cartier, Roberts Bank and, very lately, Prince Rupert. Renewable resources and general cargo exporters tend to be more stable because they supply basic consumer demands and are linked to large producer regions like the Prairies or the industrial heartland of Canada. However, grain production is vulnerable to climatic conditions, so both supply and demand can vary considerably. Although Canada's exports have generally been predictable, the utilization

of ports has been less certain due to the competition between various intermodal options and amongst ports themselves (Ffrench 1979). Great Lakes grain terminals compete with Vancouver grain terminals, as do the ports of Montreal, Halifax and Saint John for general cargo trade.

Shipping technology is always progressing, and several developments have had a major impact on cargo trading patterns. Containerization of general cargo has had a dramatic impact on intermodal transportation, which has favoured coastal ports at the expense of inland ports. The use of larger vessels further antiquates the Seaway and older coastal ports, thereby increasing the utilization of deep water ports like Halifax, Quebec City, Baie Comeau and Roberts Bank. It has been noted that innovations in the design of ships usually precede and, in turn, induce the development of appropriate port facilities (Bird 1979). Consequently, shipping technology, innovations and their implications for trade should be closely monitored when projecting future port investments.

2) Declining Port Manufacturing

A decrease in the number of industries that require port locations has resulted in the deterioration of older port areas. Most Canadian port cities initially served gateway functions but later evolved into regional commercial centres. Since transportation terminals historically developed adjacent to harbours, the surrounding area became a prime industrial location even for firms not utilizing the port. Consequently, the early decline of port areas has often reflected the decentralization of non-port users that wished to avoid the congestion of the inner city.

The number of non-port users has steadily increased because Canadian industrial development was based on import substitution.

This reduced imports of consumer goods and had little effect on exports because production was geared to domestic markets. Also, Canada's major trading partner since the late 1800's has increasingly been the United States, while European ties have diminished. Continental trade has not generally been conducive to waterborne shipments.

Port manufacturing decline has also been an element in the current trend of industrial decentralization from inner city areas. Inner city decline has been attributed to high factor costs (land, labour and taxes) and transportation costs relative to suburban areas; lack of space for expansion; and the spread of external economies to suburban areas. These views have been supported by Hoover and Vernon (1959), Pred (1964), Lever (1975) and Keeble (1968 and 1978). Moses and Williamson (1966) ascribed the decline to changes in technology (e.g., integrated and mechanized single-storey plants) and transportation cost (e.g., expressways have reduced costs to suburban locations) which combined to erode the traditional advantages of the inner city. This approach has been succeeded by Lloyd and Mason (1978) and Gripaios (1977). Localization economies diminish as the loss of businesses creates negative multiplier effects which, in turn, trigger further decentralization. The location of port installations are relatively fixed due to capital investments in specialized infrastructure. Consequently, port functions tend to persist amidst deteriorating core areas until urban redevelopment puts pressure on port relocation. If the port's trade has remained prosperous, as in the case of Montreal, port investment at an efficient new site can be welcomed. However, at a port like Toronto, additional investments are difficult to justify when trade is declining and the existing port functions are facing increasing competition for use of the waterfront.

Another significant factor contributing to port manufacturing decline is containerization of general cargo. Containerization has simplified land/water connections by utilizing standard shipping units which are most efficiently handled by large, active terminals that can justify the expenditure on modern handling facilities. These innovations have greatly improved turnaround time for vessels and the dispatching of cargoes at terminals. In turn, this removes the requirement for port access by firms that import and export general cargo commodities. Since these firms are less likely to locate near a port, the choice of port to utilize can vary readily and is often determined by shipping agents.

Since port manufacturing decline has been associated with the declining need for direct port access, only a few, although large, users remain. These industries include primary iron and steel, petroleum refining, wood products, and thermal generating stations. Shipbuilding and repairs obviously have a stable requirement for direct water access, but the industry itself has declined in the face of foreign competition. However, the growth of the Great Lakes shipping industry has provided demands for domestically built lake vessels, although shipbuilding itself has been consolidated at a few ports. All of these large port installations have tended to decentralize because their increasing land and environmental demands conflict with the congestion, high prices and zoning restrictions of inner city locations. Also, these new installations have become increasingly integrated complexes that require far fewer linkages, thus enabling them to locate in rural settings. Examples of port decentralization include: oil refining in Clarkson, East Montreal, Dartmouth and Port Moody; wood products on the Lower Fraser River; thermal generating stations at Lakeview and Nanticoke; nuclear power generation and heavy water production at Becancour; steel works at Nanticoke and Contrecoeur; and a complex

consisting of wood products, heavy water production and shipbuilding at Port Hawkesbury.

3) Increasing Land Competition on the Central Waterfront

Historically, manufacturing, transportation facilities and cargo handling activities have dominated the central waterfront in Canadian port cities. The elimination or decentralization of these functions has freed land for other activities that are better suited to an inner city location. Development of these areas has typically occurred in two stages. The first is a transitional stage that begins while the port is still active but port related uses are diminishing. The vacated industrially zoned properties attract labour-intensive factories, noxious industries or firms serving the local urban market (Norcliffe 1981). They locate here due to lower capital outlay, lax zoning restrictions, low demands for services, proximity to an inner city labour force and external economies of the urban core. The nature of these operations and the lack of investment for renovating buildings contributes to the deteriorated state of older port areas.

The second stage has been one of urban redevelopment schemes to rejuvenate these blighted areas. Most of these projects have been authorized by municipal or federal governments that were able to purchase waterfront sites, rezone the land and provide funding for new activities. Generally an extensive, recreational parkland was conceptualized, but often more profitable commercial, residential and institutional endeavours have been included. Existing or planned Canadian waterfront redevelopment exists in Toronto (Harbourfront Corporation, 1978), Montreal (Le Vieux Port de Montréal, 1979), Halifax and Quebec City (Ministry of State for Urban Affairs, 1978), Saint John (Rocca Group, 1978), Sault Ste. Marie (Dillon, 1976) and Vancouver (City of Vancouver, 1979). In fact, this trend

has been popular throughout most North American port cities (Merrens 1980).

Since urban waterfront schemes were made possible by either the decline or relocation of port activities, there have not been major confrontations between industrial and recreational land uses. However, most plans encourage the natural evolution from industrial to recreational uses as industries eventually relocate, but few plans incorporate both activities. This transitional approach can be detrimental to the remaining port functions because new operating pressures and standards are faced by establishments that may not be anxious to move. Further investment in port infrastructure or industrial expansion is restricted either by land use and environmental regulations or by uncertainty of the area's future development. The remaining port operations may soon be unprofitable if facilities tend to be out-dated, inefficient and difficult to renovate. This scenario plagues the older port installations at Toronto and Montreal, although the latter offers the option of relocating in the same region.

4) Declining Direct Employment at Port Operations

The fourth key factor in port changes does not refer to employment lost from declining trade nor the decentralization of port functions. Instead, it relates to the increasing capitalization of port infrastructure which has displaced traditional jobs. Trade at Canadian ports has been dominated by bulk cargoes. The rapidly expanding tonnages handled and the physical characteristics of bulk cargoes have made it imperative for ports to mechanize handling procedures. As vessel size has increased, minimization of turnaround time at docks has become critical. In response, large shore facilities such as ore bridges and conveyor belts have replaced individual cranes and front-end loaders, reducing manpower

on the vessels and especially at port installations. The most recent trend is toward self-unloading vessels which require few facilities or labour at the receiving dock. An excellent example is Stelco's pier at Nanticoke, which simply employs a hopper and a conveyor belt to receive and distribute the raw materials to stockpiles inland.

Twenty years ago general cargo trade was labour intensive because stevedores were required to load and unload individual commodities. These cargoes, often fragile or perishable, had to be stored in warehouses inland. The only mechanical aids were cranes and fork lift trucks, which meant a long time in port for vessels. Finger piers provided the most efficient method of minimizing the handling distance between the vessels and the warehouses.

In the early 1960's, handling problems were being solved by unitized cargo -- first pallets, then crates and finally standardized metal containers. Unitized cargoes require less handling and enable more mechanization of loading and unloading techniques. Fork lifts and cranes could be replaced by gantry cranes where the volume of cargo justified such investment. Meanwhile, special container vessels were constructed to make efficient use of the vessel's capacity and the shore facilities. Other vessel designs permit stern or side loading techniques for RO-RO cargo. Containerized cargoes are more durable and weather resistant, which allows them to be stored outside on back-up land. This has made finger piers, warehousing operations and related employment virtually obsolete. Consequently, far fewer people are directly employed in port operations, despite increasing cargo tonnages.

With the loss of direct port employment and the decline in port-related manufacturing and services, ports have fewer linkages

with the local area and no longer play a large role in city formation. Any recent examples of industrial ports seem to be poorly linked to the local economy. Most of the other ports in Canada are regressing to little more than transshipment points which passively service the local, regional or national hinterland. The trends and effects of port-city linkages are summarized in Table 1.

Hamilton: An Anomaly

Persistent industrial growth on Hamilton's central waterfront leads one to assume that the port has not experienced trends evident at other Canadian ports. Cargo tonnages have grown rapidly from 5,334,397 tonnes in 1952 to 14,875,971 tonnes in 1979. Commodity types have varied somewhat due to the alteration of local requirements, although coal and iron ore have continuously dominated tonnages. The opening of the Seaway enabled overseas trade links and greater use of Canadian raw materials by the local steel industry. Domestic tonnages rose from 13.9 per cent to 52.8 per cent of total trade between 1958 and 1977. Since there is little evidence to suggest non-conformity with Canadian shipping trends, the explanation for the anomalous waterfront development must lie elsewhere.

The declining number of industries utilizing ports appears to have had little impact on the port of Hamilton. Forty-four per cent of the bay's shoreline was occupied by industry in 1970 (Miller and Szewezyk 1971), although the industrial shoreline has mostly grown by landfilling. Although Hamilton is an established urban and industrial centre, the bayfront area is still dominated by heavy industries which demand large quantities of unprocessed inputs. Constant demands for additional industrial land have fostered plans for port expansion. Despite extravagant proposals for an outer harbour concept (H.H.C., 1974), there has been little

Table 1
SUMMARY OF PORT-CITY LINKAGES[1] -- CANADIAN TRENDS

Linkage	Trends	Reasons	Locational Requirements
OPERATIONAL			
·Cargo Handling, Dock Yards and Warehousing	·Declining Needs at all Ports	·Fewer, Larger Vessels ·More Capital Intensive ·Containerization	·Direct Port Access ·Decentralized with other Port Activity
·Dredging and Harbour Management	·Varies at Ports	·Local Requirements of Harbour	·Direct Port Access
ANCILLARY			
·Shipping Companies	·General Decline	·Consolidation of Lines and Service Provided	·Only Terminals Need Direct Port Access
·Freight Forwarders	·Varies	·Competing among Ports	·Indirect Port Access
DISTRIBUTION			
·Transport Services	·Declining Needs	·Containerization ·Modal Competition	·Indirect Access for Servicing Ports
·Storage and Distribution of Bulk Cargo	·Varies at Ports	·Varying Cargo Demands ·Modal Competition	·Extensive Land Use ·Decentralization
MANUFACTURING			
·Shipbuilding and Marine Engineering	·Varying Demand at few Ports	·Consolidated Activity ·Foreign Competition ·Domestic Demand Varies	·Direct Water Access ·Separation from Port Port Activities
·Industries Processing Inbound Raw Material	·Declining at Ports	·Economies of Scale ·Competition for Space	·Decentralized Access for very Large Users
·Industries Processing Outbound Raw Material	·Little Activity	·Raw Materials Rarely Processed at Ports	·Indirect Port Access ·Non-Urban Activity
·Industries with Overseas General Cargo Transactions	·Drastic Decline at Ports	·Containerization makes Transshipment Feasible ·Firms Decentralizing	·Indirect Port Access Firms Decentralizing from the Inner City

[1]These linkages are defined by Witherick (1979)

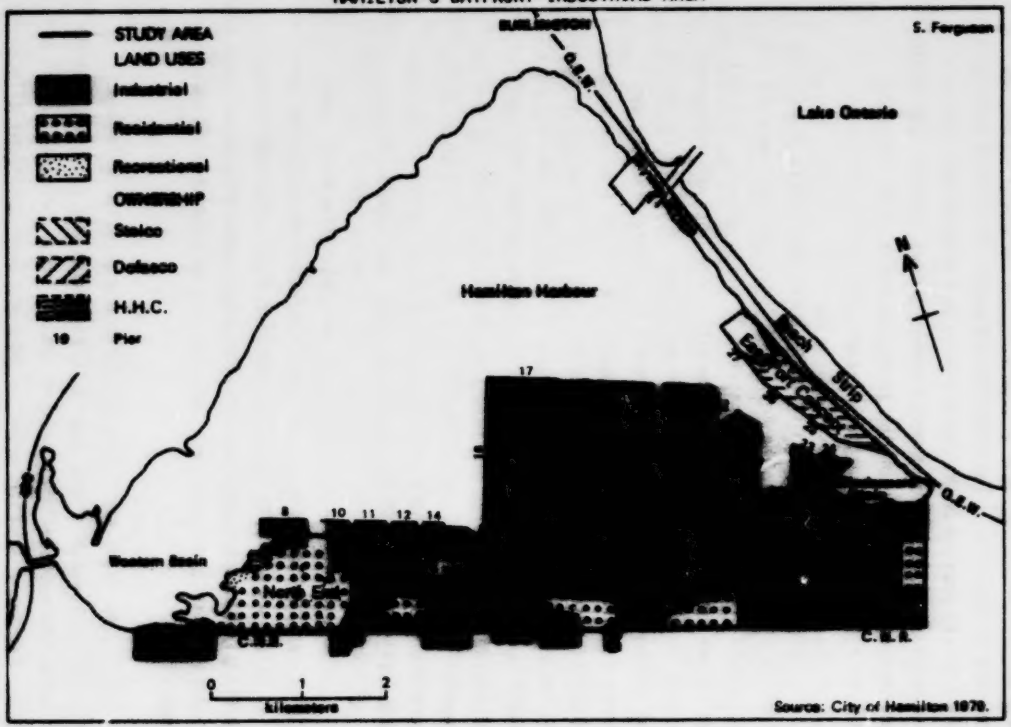
evidence of port activities decentralizing. The recent start up of Stelco's Nanticoke steel complex is a move towards a 'greenfield' port location and resulted from Stelco's inability to expand further in Hamilton. However, Nanticoke was planned to increase steel output rather than to replace current facilities.

There has only been minor evidence of urban waterfront redevelopment schemes that are common in most Canadian port cities. The major land competitors have been industries themselves. In fact, it has only been recently that residential enclaves have managed to repel industrial expansion. The enclosed shape of the harbour has provided recreational activities with access to shorelines that were unsuitable for port and industrial operations (Figure 2). Although demands for recreation have increased, the quality of the harbour offers limited potential with the exception of mooring and sailing small pleasure craft. The lake side of the Beach Strip has been proposed for open space and recreational parkland which will replace an existing low income community (Hamilton Region Conservation Authority 1976). Potential conflicts may arise with the proposed West Port Concept (H.H.C. 1978) that has designated 124 acres on the harbour side of the Beach Strip for marine-oriented industry and commerce (Globe and Mail 1979). It is clear that the major thrust for development in Hamilton Harbour is still for port and industrial uses.

The Significance of Hamilton's Industrial Port Development

One main concern is the problem of inner city industrial decline and the subsequent social and economic impacts. Relocation of firms can have a significant effect on the municipal tax base because industries pay proportionally higher taxes than other feasible uses in the area. Depending upon the jurisdictional and revenue structure of the city, inner city areas may

Figure 2
HAMILTON'S BAYFRONT INDUSTRIAL AREA



have deteriorating services or could pose a financial burden on the rest of the city. The deteriorated state of vacated industrial property can lead to undesirable living and working environments. The usual solutions involve urban redevelopment schemes, but these can have adverse effects on the remaining businesses and can be difficult to implement financially and socially.

Firms that relocate to suburban locations reduce inner city linkages and employment. The losses of localization economies and disposable incomes can have negative multiplier effects in local businesses and the surrounding community. The loss of employment depends on the firm's new site, the employees' place of residence, the employees' flexibility to relocate or commute and the new labour requirements of the firm. Such moves often involve capital intensification which demands proportionally less blue-collar work. The lower wage earners tend to be recent immigrants, who are more likely to reside in the inner city, less able to bear the costs of relocating or commuting, and have more difficulty securing new employment due to their lack of skills and education. Consequently, there are growing numbers of unemployed workers in the inner city that must compete for fewer and fewer local job opportunities.

The undesirable direct effects and side effects of industrial decentralization have only recently prompted action in Canadian cities such as Toronto (Toronto Star 1979). Unfortunately, historical evidence suggests that industrial decentralization is a universal process and one that is difficult to halt once it commences.

Chapter III
RESEARCH STRATEGY

Introduction

The objective of this paper is to offer an explanation for an unexpected occurrence, to make it a comprehensible event. It was anticipated initially that the interrelationships between port functions and industrial activities were a key factor in this explanation. Consequently, the research design had to incorporate data on port activities and data on industries in the bayfront area. This chapter describes, in detail, the delimitation of the study area and the data collection processes -- particularly the questionnaire survey utilized in this study.

Defining the Port of Hamilton

Hamilton Harbour refers to the triangular body of water that was naturally created by the spit that crosses the western end of Lake Ontario (Figure 2). At present, port and industrial activities only occupy the southern shore of the harbour. The port consists of public docklands that are owned and operated or leased by the Hamilton Harbour Commissioners, and private docklands owned by industries. Port operations include dredging, navigational aids, berthage, maintenance of piers, cargo handling and cargo storage, and require machinery, labour, storage facilities, backup space and land transport connections. These services are provided by terminals directly at the port or local establishments in the port area.

Spatially defined, the shipping activities occur on piers 8 through 24, with the exception of a navy pier and derelict private piers. However, significant indirect port services are often physically separated from the port. These include transport

companies, marine suppliers, mechanical repair services and freight forwarding agents. Moreover, the H.H.C. and certain tenants provide alternate functions such as marinas, sailing schools, maritime community services and policing of the harbour. The H.H.C. also has authority over all shipping and navigation in Hamilton Harbour, although this has traditionally been interpreted to include dredging and landfill operations. Recently, this authority to control and manage the development of new harbour lands has been challenged by the City of Hamilton and the Hamilton Regional Conservation Authority (H.R.C.A.).

The major area for port-related industry is north of Burlington Street because direct port access is available (Figure 2). This area includes medium-sized firms that lease waterfront property from the H.H.C., the main steel works of Stelco and Dofasco, and other large heavy industries (International Harvester, Canron, National Steel Car, Stanton Pipes, Firestone, Domtar, Cities Service Chemicals, Stelco's Parkdale Works, National Slag and three scrap metal processors). However, this is not a complete representation of the industrial core, because Burlington Street bisects the operations of Stelco and Dofasco and excludes many large firms that are indirectly related to port activity or the steel industry, or else provide a more diversified industrial sector (American Can, Otis Elevator, Procter and Gamble, Bridge and Tank, Burlington Steel, Stelco's Frost Works, Westinghouse, Douglas and Norton). This area also incorporates numerous small and medium-sized establishments which are equally important elements of the industrial complex (Czamanski 1976).

Delimitation of the Study Area

Port manufacturing studies often delimit areas which are subsequently labelled port industrial areas. The term can be

misleading because an industrial area adjacent to port facilities does not signify that all the firms are port related. Also, the entire traffic through the port is rarely generated or destined for adjacent industries but instead draws upon regional and national hinterlands. However, this study is not simply concerned with port users; it is concerned with the mutual influence of the inner city industrial area and the port. Consequently, the delimitation of the study area for Hamilton is based upon the proximity of the bayfront industrial area to the previously defined port, with the realization that many firms do not use the port facilities. Fortunately, local industries generate 96 per cent of port activity by tonnage, thereby enabling most of the current users to be examined. The following description gives a precise delimitation of an area that is considered functionally and spatially integrated, yet is manageable for the purposes of this study.

The harbour headline was designated the northern boundary of the study area (Figure 2). The most obvious southern boundary is the C.N.R. line, which generally separates the industrial sector from the commercial and residential activities along Barton Street. However, there are a few large firms located directly south of the railway line which are included. These older businesses were established prior to landfilling processes and have since become separated from the waterfront.

The western boundary is formed naturally by the shoreline. It incorporates more passive marine activities and also the North End residential neighbourhood (Official Plan Amendment No. 200). This neighbourhood is the largest and most viable residential enclave in the bayfront area, and it has played a key role in retarding further industrial expansion. Residential enclaves are recognized as part of the study area because they constitute a strong

competitor for land and can be beneficial for the development of inner city areas.

The eastern boundary is formed by residential property between Parkdale and Woodward Avenues. In this area, the industrial characteristics and functions begin to change because firms were established much later there than in the core areas. Light manufacturing became intermixed with wholesaling and retailing activities. These firms relied to a greater extent on trucking and proximity to the Q.E.W., rather than the port or linkages with the bayfront industries.

Data Collection

The initial data for the study were derived from Statistics Canada shipping reports and the H.H.C.'s annual cargo reports. These two sources provided information on vessel arrivals, vessel types, cargo types, inbound and outbound tonnages, origins and destinations, and activity at individual piers. Personal correspondence with members of the H.H.C. enabled a greater understanding of port operations, capital and labour requirements, and the capacities of port infrastructure.

The second type of data collected were published reports on existing and proposed port policies (H.H.C. Port Master Plan, and Planning Amendment No. 318), industrial policies (Official Plan for Industry, 1977) and transportation policies (Draft Official Plan, 1980). The documents provided evidence of planning objectives and strategies of the City and H.H.C., both of which have direct control over the development of the bayfront.

The only remaining data to obtain concerned industry in the bayfront industrial area. Since this study required a

variety of detailed and recent data on firms in a specified area, a survey had to be performed. The firm, being the unit of observation, was defined as a manufacturing/processing operation or an industrially related activity such as transportation and storage, wholesaling, matching and contracting services. A necessary restriction was size, causing the elimination of businesses that were too small (e.g., ten employees) to survey properly or to be of significance to the study.

A questionnaire survey involved personal interviews with senior management officials. The questionnaires were generally completed during a single visit that lasted approximately forty-five minutes. Some of the larger firms required return visits because the questionnaire had to be circulated within various departments to obtain accurate information. One hundred and five suitable observations were obtained by the author in the summer of 1979 (a list of firms interviewed is included as Appendix A). Initially, 191 establishments listed in the Hamilton-Wentworth Business Directory were considered functionally suitable by definition, but only 125 met the minimum size requirement. Therefore, 84 per cent of the defined population was surveyed; only seven firms refused interviews while the rest were never approached due to time requirements. This high response rate is attributed to conducting the interviews in person, the author's affiliation with the Canada Ports Project and the Joint Program in Transportation, and the excellent cooperation of the business community.

Questionnaire Design

The questionnaire used in the study is included as Appendix B. It had been previously tested in Toronto (Ainlay, 1978) and was modified to accommodate the author's needs and the specific requirements of the Hamilton case. The questions were intended to elicit

open-ended responses rather than to supply the respondent with a set of alternatives, as was done in a similar study of Hamilton by Walker and Bater in 1969. Encouraging open-ended qualitative responses increased the range of possible answers and enticed more discussion during the interview. The drawbacks were that important responses may have been overlooked and that responses were more difficult to quantify. There was also no attempt to rank qualitative responses. Instead, responses were all regarded as equally significant, and multiple response computer tabulations were utilized in evaluation. Since the number of responses to a certain question would vary, certain assumptions for weighting factors during analysis had to be made.

The use of personal interviews afforded many advantages. It enabled a good rapport to be developed between the interviewer and the respondent, which led to increased assurance in confidentiality and likely resulted in more detailed, accurate responses. It permitted correct interpretation of questions and answers which reduced misinterpretation and the need for additional correspondence. The questionnaire design allowed for responses to be probed, as problems or queries arose that could not have otherwise been handled. This often justified apparent paradoxes and, in general, led to a higher level of comprehension.

One disadvantage of personal interviews involved the time requirements of setting up and conducting interviews. However, this was offset by the higher response rates, the quick retrieval of information and possibly a reduction in the company's time to complete the surveys satisfactorily. Another problem was that respondents may not have been suitably prepared for the interview, despite the use of advance calls to set up the meetings. Nevertheless, the questionnaire attempted to focus on manageable responses

without sacrificing much accuracy and at the same time deriving considerable knowledge about the firm. Only for the largest and most complex companies was additional correspondence required to alleviate this problem.

The questionnaire had four major sections: 1) the basic profile; 2) inputs and outputs; 3) use of port facilities and other transportation; and 4) problems of location. The basic profile was designed to collect the necessary preliminary data about the firm such as activities, site characteristics, employment and corporate structure. This enabled the classification of firms by industrial category, function and size. This data was easily quantifiable and could be utilized to compare the bayfront area's characteristics with trends in other old, inner city industrial areas. Such indicators included: high density or multi-level buildings; crowded sites (indicative of numerous in situ expansions); large amounts of outside storage and little green space (suggesting less stringent zoning regulations); and insufficient parking and loading areas (evidence of older, unplanned districts). These are examples of 'compulsive' factors that affect inner city industrial areas (Keeble 1978, 108). Many of these trends are re-evaluated using data from other parts of the questionnaire but the basic profile generated factual, straightforward and unbiased responses.

The second section of the questionnaire comprised a very detailed analysis of the firm's material inputs and outputs. Such a case study permitted the evaluation of the locational interdependence of firms by identifying their backward and forward linkages. If most linkages were local, one could deduce that the study area constituted an integrated industrial complex (Norcliffe and Kotseff 1980). Since this input-output data provided origins and destinations, supply and market area analyses could be performed. These

describe firms' foreland and hinterland relationships, providing a predictive measure of the importance of localization economies to the bayfront industries. Future trade depends on the growth prospects of traditional and potential port users. Growth potential can then be related to: the firm's commodity origins, destinations and import/export opportunities; the location and stability of supply sources and markets; and the firm's propensity to use marine transportation and, in particular, the port of Hamilton.

It was difficult to derive precise figures in this section and the time required to achieve this would not have been justified. For example, responses either gave the previous year's statistics or a combination of the present year's actual figures and calculated projections for the remainder of the year. Another problem was that certain commodities were difficult to estimate, while others were measured in quantities that prevented comparative analysis. A final concern was that the definition of major inputs and outputs varied with the size and complexity of the firm, thereby overlooking some important commodities and including some relatively insignificant ones. Fortunately, several of these larger commodities appeared as inputs or outputs of smaller firms which established the presence of an omitted linkage. Since the data collected in this section had no comparable sources, these shortcomings were unavoidable and considered unimportant for the scope of this paper.

Questions on the use of port facilities were designed to supplement other data sources and provide quick reference to the type and frequency of usage. This was valuable for the designation of direct and indirect users, users of other ports, and firms without any overseas transactions. The use of other transportation was probed to evaluate the land transport demands at the plant site, at the port, within the inner city, and in and out of the region.

Transportation problems were queried to determine the inadequacies of facilities, services, local access routes in the inner city, and connections to surrounding regions. Reasonably accurate information on shipping and receiving was obtained and the responses accounted for seasonal variations. Responses to problems were obviously qualitative and sometimes biased, but they generally reflected the perceptions of industry to the transportation infrastructure -- some favourable and some not so favourable.

The last part of the questionnaire was concerned with problems of location. The objective was to test the relevance of industrial location theories of inner city areas with Hamilton's bayfront area. An initial approach was to ascertain original locational choices, where possible, in order to identify changes in the locational advantages of the site and the industrial core over time. A consequential factor in comprehending continued growth in the bayfront area was to consider the competition for space. The demand for industrial land can be predicted by comparing a firm's present site requirements with its needs for physical expansion of operations.

A series of questions attempted to appraise the firm's satisfaction with its location. This was done by examining the perceived advantages and disadvantages of the present location, the preferred location and the feasible locational alternatives for the firm. The aggregated responses were expected to typify the trends of inner city areas and further analysis would elucidate the apparent prosperity of this bayfront industrial area. The port was not expected to be influential for present locational decisions of most firms.

This section of the questionnaire provided mostly qualitative data; therefore, a behavioural approach was followed to

consider locational decisions. However, the previous analyses of material linkages, transportation requirements, and land competition were recognized as constraints on locational behaviour. A problem with qualitative data, besides the restrictions for utilizing quantitative techniques, was that responses may only consider one individual's viewpoint, but it was generally felt that respondents were careful to reflect the company's policies.

Chapter IV
INDUSTRY AND THE PORT

Introduction

The relationships between the port and the surrounding industries must be examined to determine their locational interdependence. Port facilities that provide a transshipment function for the region would be locationally footloose compared to facilities that serve industries directly. Consequently, it is presumed that the industrial character of the port of Hamilton would prevent the decentralization or abatement of port activities. One must also take into consideration that the enclosed shape of Hamilton Harbour inhibits the spread of port activities.

Analysis then switches to the bayfront industries in order to explain continuous industrial growth at an inner city location. Given the dominance of the steel companies in both industrial and port activities, they provide the common link for inner city port growth. However, "manufacturing on the large scale is no longer economically viable in most urban areas. Where manufacturing activities do survive they will tend often to be those with an overriding need for centrality; a need sufficiently powerful to offset the real disadvantages associated with the inner-area situation" (Lloyd and Mason 1978, 89). Therefore, some extraordinary land development processes had to exist for the primary steel industry to achieve large scale operation within an urban environment. It is hypothesized that land acquisition techniques promoted oligopolistic land ownership, thereby providing growth opportunities for Stelco and Dofasco within Hamilton. Today, the bayfront industrial area may be on the threshold of decline because conventional expansion alternatives have been curtailed.

Port-City Linkages in Hamilton

Hamilton Harbour has often been cited as an excellent natural harbour which provides access for large ocean and lake vessels, dockland for port industry and a location in the heartland of Canada's most densely populated and heavily industrialized area. The development of the steel industry in Hamilton is a textbook example of a market location which utilized the port to procure its raw materials. Since the turn of the century, growth of the port has almost been synonymous with the growth of Stelco and Dofasco.

In 1979, the port of Hamilton had a record year with total cargo handled equalling 14,875,971 tonnes (Table 2). Port trade is dominated annually by inbound tonnages of iron ore and coal for the steel companies (87.7 per cent of the total tonnage in 1979). This immediately causes a huge trade imbalance; in fact, only 3.6 per cent of total tonnage is outbound. Even excluding these dominant cargoes, Hamilton is essentially the recipient of bulk commodities such as sand, fuel oil, coke, phosphate, gypsum, ores, soya beans, salt, potash, urea and fluorspar. The major inbound general cargoes include steel, ingot moulds, pig iron and unspecified general cargo. Many outbound cargoes are also geared to the steel industry and comprise shipments of coke, scrap metal, steel, grinding balls and creosote. Other shipments include fuel oil, gasoline, stone and unspecified general cargo. Approximately three-quarters of general cargo trade is domestic traffic handled by Canada Steamship Lines package freight division.

Nine hundred and fifty-nine vessels arrived at the port of Hamilton in 1979. The large tonnages arriving at the steel companies' private docks are handled by only 55 per cent of vessel arrivals due to the utilization of fully loaded lakers of Seaway capacity. Bridge cranes are used by Stelco and Dofasco to unload

Table 2
COMMODITY TONNAGES AT THE PORT OF HAMILTON IN 1979

Port User	Inbound Cargoes	Tonnages (Tonnes) Lake	Overseas	Total Tonnages
Steel Companies	Iron Ore	7,683,915	212,184	
	Coal	5,137,727		(87.7%) 13,033,826
Other Manufacturing & Processing	Soyabeans	70,216		
	Molasses	7,000	2,990	
	Carbon Black	10,236		(0.6%) 90,442
H.H.C. Terminals	Phosphates		66,434	
	Urea		27,134	
	Steel		99,447	
	Moulds		8,928	
	General		5,023	(1.4%) 206,966
Other Leased Terminals	Sand	252,410		
	Fuel Oil	248,403		
	Coke	100,179		
	Salt	69,603		
	Fluorspar		25,954	
	Coal	20,000		
	Potash	19,028		
	Phosphates		13,120	
	Gypsum	76,845		
	General	49,247		
	Steel	52,226		
	Ores	72,295		(6.7%) 999,310
Inbound Totals (96.4%)		13,869,330	461,214	14,330,544

continued ...

Table 2 (continued)
COMMODITY TONNAGES AT THE PORT OF HAMILTON IN 1979

Port User	Outbound Cargoes	Tonnages (Tonnes) Lake	Overseas	Total Tonnages
Manufacturing & Processing	Steel		20,000	
	Creosote	6,566		
	Soya Oil		3,005	(0.2%) 29,571
H.H.C. Terminals	Steel		29,172	
	Auto Parts		10,847	
	General		8,357	(0.3%) 48,376
Other Leased Terminals	Coke	78,487		
	Stone	75,878		
	Scrap	51,046		
	Fuel Oil	17,321		
	Steel	11,620		
	General	233,128		(3.1%) 467,480
Outbound Totals	(3.6%)	474,046	71,381	545,427

Inbound Totals	13,869,330	461,214	14,330,544
Outbound Totals	474,046	71,381	545,427
GRAND TOTAL	14,343,376 (96.4%)	532,595 (3.6%)	14,875,971

raw materials from bulkers but self-unloaders are becoming increasingly popular to reduce unloading times, especially for coal. Despite Hamilton's Seaway access to world shipping lanes, overseas cargo only totalled 532,594 tonnes and was similarly dominated by inbound bulk cargoes. Approximately 60 to 65 'salties' accounted for the 255,342 tonnes handled at the two H.H.C. terminals (Table 2). These terminals on pier 8 and pier 10 comprise all the overseas general cargo trade as well as major quantities of bulk cargoes (phosphate and urea) and neo-bulk cargo (steel). Containerized cargo is insignificant, although a specialized fork lift truck is available to move containers to and from dockside. Other general cargo is often crated or palletized for ease of handling which minimizes the requirement for inside storage at the terminal buildings. The remaining overseas tonnage (277,252) involved 50 to 55 ocean vessel arrivals at private or leased piers. The recipient port industries were Dofasco, Seaway Terminals, Canadian Vegetable Oil Processing and Xtravim Agricultural Products. Inbound cargoes included iron ore, manganese ores, phosphate, fluorspar, chromite sand, pig iron and refined molasses, while shipments included coke breeze, soya bean oil and, in previous years, scrap metal.

The remaining 340 - 350 vessel arrivals accounted for 1,473,500 tonnes of domestic or American lake traffic and was handled at H.H.C. piers that are leased to industry. These activities included marine transportation (Canada Steamship Lines), cargo handling and storage (Weaver Liquifuels, Myers Fuels, Seaway Terminals and Lake Shore Sand), manufacturing or processing inbound materials (Canadian Vegetable Oil Processing, Red-D-Mix Concrete and Xtravim Agricultural Products) and marine services (Shell Canada's bunkering operations, Berminghammer Corporation's pile driving, Canadian Dredge and Dock, and Strathearne Terminals' shipwrecking). Also, Petrofina, Domtar Chemicals and Cities Service Chemicals

operate pipeline jacks at pier 23 for liquid products and fuels. Excluding the aforementioned firms, there were twelve indirect port users in the survey that shipped or received commodities through the various bulk and general cargo terminals. They accounted for 35,000 tonnes inbound and 55,000 tonnes outbound.

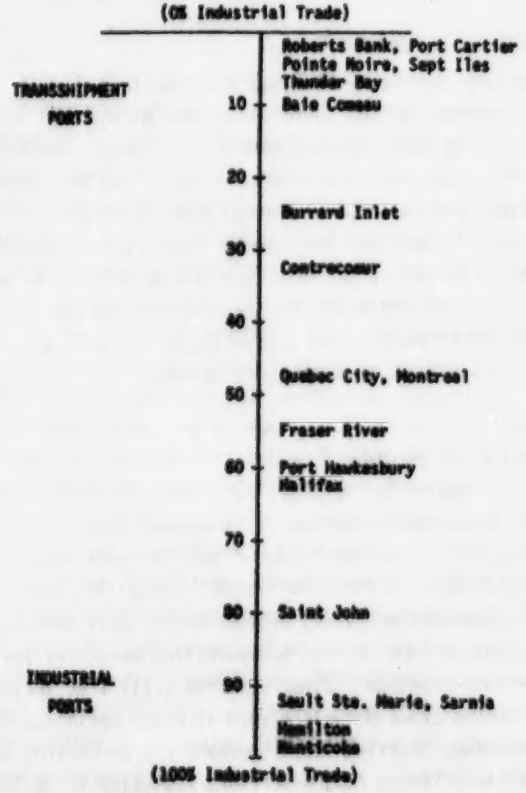
Evidence of the lack of transshipment functions at the port of Hamilton suggests that the port does not serve a gateway function for a large spatial hinterland. Instead, most of its trade is generated by industries in the local area. Using a simple classification of ports (transshipment versus industrial activity), it can be shown that Hamilton has remained an industrial port despite its growth as a regional centre.

Transshipment points involve the import and/or export of cargo that is destined for and/or produced by a region beyond the local port area (or city). Therefore, a transshipment point is an entrepôt for a larger hinterland and, consequently, generates few port-city linkages and very little local employment. Extreme examples include Roberts Bank, Port Cartier and Thunder Bay (Figure 3). In contrast, an industrial port handles cargo that is destined for and/or produced by the local area (or city) which, in turn, generates linkages and creates direct and indirect employment. Extreme examples include industrial installations at Sarnia, Sault Ste. Marie and Nanticoke.

Most urban ports perform transshipment and industrial functions in similar proportions. They tend to be older port cities that developed regional gateway functions in addition to locally induced trade. Ports such as Montreal, Quebec City and Halifax verify this hypothesis (Figure 3). Saint John is biased towards industrial functions due to large imports of crude petroleum for refining, whereas Burrard Inlet is biased towards transshipment

Figure 3
CLASSIFICATION OF MAJOR CANADIAN PORTS

Ports are considered to have industrial trade (inbound cargoes that are to be processed locally or outbound cargoes that have been processed locally) and/or transshipment trade (any cargo not processed or destined to be processed locally).



functions by its huge grain exports. Given these classifications to explain port development, one expects an older urban centre like Hamilton to serve more gateway functions, but its activities have an increasingly industrial orientation. In terms of port trade, 96 per cent of total tonnage was destined for or produced by industries within Hamilton.

Trends in Port-City Linkages

Generally, port-city linkages have declined, but port manufacturing in particular has suffered because direct port access is imperative for few manufacturing operations. Today, there are three activities that dominate port manufacturing: iron and steel foundries; petroleum refineries; and thermal power generation. These tend to be very integrated, large-scale installations which require vast quantities of industrial water and raw materials that are most economically transported by water. As Hamilton evolved into a major primary steel centre, the prosperity of the port was assured, but how have other aspects of the port managed?

In general, the shipping industry has constructed larger and larger vessel sizes in order to reduce the shipping cost per tonne. Larger vessels require better shore facilities to accommodate handling procedures because reduction in turnaround time is increasingly critical. Only large-scale users require large vessels and expensive investments in port facilities. Industries that receive general cargo commodities rarely require direct port access and intermodal containerized traffic has permitted decentralization from port areas altogether. Other affected activities include processing of inbound crude materials such as sugar refining, flour milling, breweries, distilleries, vegetable oil processing and molasses refining. These food processors typically serve local markets which limit their economies of scale. Consequently, rail

can be competitive for transporting domestic raw materials, thereby eliminating the need for a port location. Also, when the delivered prices for overseas raw materials escalate, it becomes more economical to substitute less expensive, local alternatives. The limited size of Seaway vessels has prolonged these activities at some Great Lakes ports, but there may be a trend to consolidate at deep sea ports operations, such as molasses refining, that still require overseas inputs.

In Hamilton, food processing activities are still located at the port, but these operations are relatively small and have a diminishing need for waterborne transportation. At present, three businesses have found it desirable to retain their operations at existing sites leased from the H.H.C. (Canadian Vegetable Oil Processing, Xtravim Agricultural Products and Henninger Breweries). There have never been many food industries utilizing the port due to competition and incompatibility with the steel industry. This is reflected in the fact that Hamilton is one of the very few lake ports without grain elevators despite its advantageous location for servicing agricultural producers in southwestern Ontario.

Over the last twenty-five years, another declining activity at Great Lakes ports has been the storage and distribution of petroleum products. Before oil pipelines linked major urban centres in Ontario, petroleum products were distributed to Great Lakes ports from refineries in Montreal, Sarnia and the United States. Most of the Canadian oil companies constructed storage and distribution facilities in Hamilton's bayfront area utilizing waterborne inputs. Hamilton was connected to the TransCanada pipeline in 1954, at which time most companies discontinued port operations and several consolidated or relocated distribution activities out of the congested bayfront area. However, Weaver Liquifuels still relies on waterborne inputs, Petrofina usually receives some

shipments and Shell Canada continues to operate a bunkering service for the harbour.

Containerization has been noted worldwide for reducing warehousing activities and the labour requirements of cargo handling. On the Great Lakes, containerization is also responsible for the absolute decline in general cargo trade by replacing break-bulk shipping operations with intermodal transportation. Larger container vessels and the economics of containerization favour coastal, deep sea ports. "Preferential railway rates for shipment to Montreal and coastal deep sea ports; increased Seaway rates; and the shipping revolution ushered in by giant container vessels are blamed for much of the Port of Toronto woes" (Toronto Star, 1980a, A8). Hamilton has never witnessed the great increase in overseas general cargo trade that was expected to follow the opening of the Seaway. Several Great Lakes ports, including Hamilton, invested in new port facilities to compete for this prospective trade but, within a decade, general cargo subsided to pre-Seaway levels. The effects of declining Great Lakes general cargo traffic severely reduced trade at ports like Toronto and Chicago, but not Hamilton because general cargo was not a major aspect of port trade.

The lack of overseas general cargo trade at the port of Hamilton is attributable to the very small size of its hinterland, the low propensity for local businesses to negotiate major overseas transactions and the utilization of ports other than Hamilton. Of 77 manufacturing or processing firms interviewed, 37 had overseas transactions of some sort, including purchases of machinery for plant operations, but excluding bulk cargoes that were handled by waterfront industries. Ten of these firms used the port of Hamilton and accounted for 144,000 tonnes of which most was outbound and consisted primarily of steel and steel products. However, four of these firms and the remaining 27 firms used other ports to export

103,000 tonnes and import 31,000 tonnes of various commodities. Steel and steel products comprised the majority of outbound tonnages, and consequently containerized cargo was only a small percentage of the total. Still, the cargoes were handled at Montreal or Halifax and occasionally New York, Saint John or Toronto. Several firms interviewed implied that service to Hamilton was not convenient or that rates were cheaper via coastal ports. However, the ultimate selection of ports usually fell with forwarding agents, who in turn were governed by the commodity origin/destination, quantity of shipment, time of shipment and scheduled service provided by shipping lines.

In general, the history of the port of Hamilton has been one of continuous growth while other older industrial ports declined. Its prosperity has been based on the expansion of the steel industry which is one of three vital port manufacturing activities today. Of the three, it generates the most direct employment, numerous backward and forward linkages, and the greatest localization economies. Port-city linkages occur as a result of the primary steel industry, but very little port activity or port employment is required for this operation. Approximately 200 employees handle the unloading and storage operations of waterborne inputs at Stelco and Dofasco. Operational, ancillary, distribution and manufacturing linkages (excluding the steel companies) are minor. Combined, they employ 860 people, of which 300 are directly involved in cargo handling. The decline in other manufacturing activities and transshipment functions have had a restrained impact because they have not comprised a vital element of port trade. However, changes in cargo-handling procedures have significantly reduced the requirements for longshoremen, as well as warehousing and cartage services.

Another means of identifying the port's current role for the bayfront industries is to analyze the transportation modes utilized

for input and output commodities. The total quantity of inputs and outputs for the firms surveyed was 23,415,000 tonnes and 16,628,000 tonnes, respectively, excluding liquid volumes. Inputs were respectively 56.8 per cent by ship, 27.2 per cent by truck and 16.0 per cent by rail. These figures suggest that the port serves a major role in the procurement of inputs. The demands for large quantities of raw materials by heavy industries justifies the high utilization of waterborne transportation. However, only 29 firms made moderate use of shipping for inputs (more than 10 per cent of their input tonnage), while 67 firms received no inputs by water and the remaining 18 firms made occasional use. Therefore, the inbound tonnages by ship largely reflect the raw material requirements of Stelco and Dofasco.

An analysis of the modal splits of outputs reveals very different findings: 79.3 per cent was transported by truck, 11.6 per cent by rail, only 4.8 per cent by ship and 4.3 per cent by pipeline. Seventy-nine firms had no use of the port for outputs and only 8 firms had more than 10 per cent of their output tonnage shipped by water. Consequently, the port's role has been minor beyond the linkages with the major steel companies.

Growth Potential at the Port

In the late 1970's, the H.H.C. projected a 50 per cent increase in tonnage by 1990 (City of Hamilton 1979, 23), and it appears that as much as 20 million tonnes of cargo may be handled by the turn of the century. However, the vast majority of this increase will reflect only Dofasco's expanding requirements for raw materials as it doubles production capacity. Also, Dofasco's modal split will increasingly favour shipping because declining rail shipments of ore from northern Ontario mines will likely be replaced

by Labrador ore. Consequently, port activity will become even more dominated by the steel companies.

If there were other growth prospects for the port of Hamilton, they would include the handling of other bulk cargoes such as potash, coke, phosphate, ores, sand and stone, which requires little processing at the port. Port manufacturing activities appear less stable due to the declining need for direct port access and the unlikelihood of new establishments, particularly at Great Lakes ports.

General cargo trade shows poor prospects because overseas cargoes favour intermodal transportation from eastern ports, while domestic cargoes utilize door-to-door trucking services. The economies of scale currently realized on most of the principal ocean routes cannot be realized for Great Lakes' overseas movements (Mayer 1973, 148). This could change if an efficient feeder service was implemented between lake ports and St. Lawrence ports. At present, Canada Steamship Lines operates a domestic general cargo service and Manchester Liners attempted a feeder service, but both have struggled to compete with preferential rail rates between central Canada and eastern coastal ports.

A feeder service that utilized redesigned lakers would be more efficient on the Seaway, and the rising costs of energy would make waterborne transport more attractive than rail transport. Only modest port investment would be required to accommodate these vessels, such as RO-RO terminals or container facilities that currently exist in the port of Toronto. If vessels were permitted to call at Canadian and American lake ports, sufficient traffic could be generated to provide a competitive and frequent transport service. A balance of upbound and downbound trade, combined with the ability to call at various ports for any cargo, would lower the

average cost of transits. The major issues to overcome include: the establishment of a fleet that would likely be unprofitable until cargo tonnages reached scale economies; and the winter suspension of service which necessitates alternative transport connections. Hamilton's location below the congested Welland Canal could enable the port to provide transshipment functions for southwestern Ontario. However, a feeder service may promote the use of more ports and thereby create smaller hinterlands. If this were the case, Hamilton's participation in such a scheme appears limited, based on current general cargo tonnages and the low propensity for industries to make overseas business transactions.

The lack of exports results from Canadian producers pursuing the security of domestic markets and the large number of American subsidiaries that have mandates to supply Canadian markets. One exception is Canada Westinghouse; it operates on a world product mandate basis, and it plans to increase overseas exports to 50 per cent from 20 per cent (Spectator, 1979). International Harvester also plans to expand its world markets. Canada's cheaper energy costs and the devalued dollar can offset higher production costs, enabling companies to compete in world markets. Firms in the bayfront area produce a variety of products that could be marketed worldwide, such as turbines, transformers, metal presses, heavy mill equipment, structural forms, farm equipment, water heaters, ductile pipe, material-handling systems, hardware and steel. These are mostly large, heavy commodities which make port access advantageous, but in the past, small and irregular shipments have often made it uneconomical for ocean vessels to call at Hamilton.

The Bayfront Industrial Complex

After reviewing the present cargo trade and activities at the port of Hamilton, it is clearly evident that industrial func-

tions persist primarily due to the two major steel companies. The port originally played an important role in city formation by inducing heavy industrial development. Soon, the steel industry overshadowed the significance of the port as a locational factor for industrial growth in the bayfront area. The dominance of the primary steel industry and its inducement for industrial agglomeration can be expressed by examining the industrial characteristics of the study area.

Total employment of the 105 firms surveyed was 45,632 and comprised 91.3 per cent of the reported employment by the Business Directory, while accounting for 45.3 per cent of the area's firms. Table 3 shows the employment and frequency of firms by industrial category and functional type. Functional type includes: manufacturing (changing the shape and form of inputs); processing (separating, cleaning or packaging); wholesaling; storage and distribution; and industrial service. Thirty-four per cent of establishments and 70 per cent of total employment are classified as primary metals or metal fabricating sectors. Stelco and Dofasco account for 58.5 per cent of employment. Similarly, they dominate the bayfront area by property size and industrial facilities. The two companies have a combined total of 1700 acres (60 per cent of industrial property in the study area) and more than 13 million square feet of floor space (50 per cent of total floor space of firms interviewed). Therefore, the bayfront area can be described as an oligopolistic industrial land market.

The early presence of blast furnaces in Hamilton attracted other primary and secondary metal industries for localization economies, while other industries and services located for agglomeration economies. This process continued until the bayfront area became a fully developed industrial core. Of the firms interviewed,

Table 3
INDUSTRIAL COMPOSITION OF THE SURVEYED FIRMS

INDUSTRY	Manufacturing		Wholesale		Processing		Storage and Distribution		Industrial Service		TOTALS	
	Freq.	Employ.	Freq.	Employ.	Freq.	Employ.	Freq.	Employ.	Freq.	Employ.	Freq.	Employ.
Food and Beverages	4	184			3	189	1	54	1	72	9	499
Chemicals & Products	7	3,254	2	77	2	36					11	3,367
Textiles, Wood Paper Products	8	479	4	150							12	629
Primary Metals	10	28,707					1	75			11	28,782
Metal Products	24	9,536	5	256					5	120	34	9,912
Crude Products	5	1,155			2	69	2	65			9	1,289
Petroleum Products	2	100					6	140			8	240
Scrap Metal					4	338					4	338
Transport							7	556			7	556
TOTALS	60	43,415	11	483	11	632	17	890	6	192	105	46,612

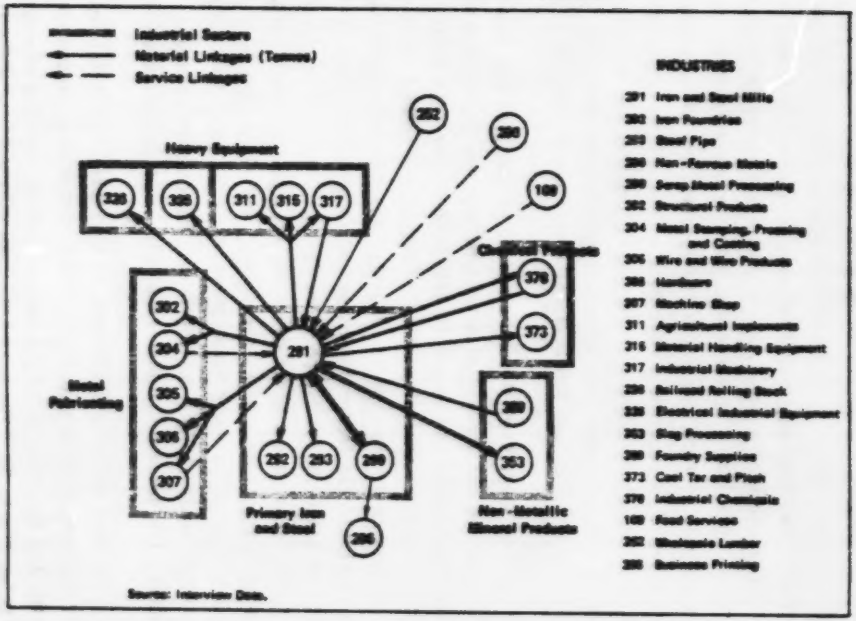
Source: Interview Data.

40 mentioned that localization economies derived from the steel companies were significant in their original locational choice for Hamilton: 24 were for proximity to steel inputs, 12 were for proximity to steel outputs, and 4 were for inputs and outputs. Another 30 firms stated that agglomeration economies were important, such as: the presence of a major, heavy industrial core; the centre of particular activities; or secondary localization economies. In contrast, only 22 firms mentioned the availability of port facilities, of which 9 required direct dock access. This evidence supports the supposition that once the steel industry was established, secondary linkages were more important than direct port-city linkages. Figure 4 displays the bayfront area's metal complex.

Having identified the significance of the port and then the steel companies for industrial development in the bayfront area, the next problem is to compare it with other inner city areas. Certain industrial characteristics or trends are common in inner city areas such as the type of industry, the functions performed, the size of plants, labour intensity and requirements, the utilization of space, and the type of buildings. Typical inner city industrial areas have a great diversity of products; small manufacturing units; single plant operations; and mixed land uses (Johnson 1972). One would expect Hamilton's successful inner city industrial complex to possess differnt characteristics that counteract the decentralization tendencies that prevail elsewhere.

The most striking difference is the heavy industrial nature of the bayfront area as opposed to inner cities with predominantly clothing and textiles, printing and publishing, or food processing industries (Table 3). Paradoxically, the port was a major factor in contributing to the growth of the steel industry, which in turn attracted other heavy industries. Other inner city areas that have

Figure 4
HAMILTON'S BAYFRONT AREA METAL COMPLEX

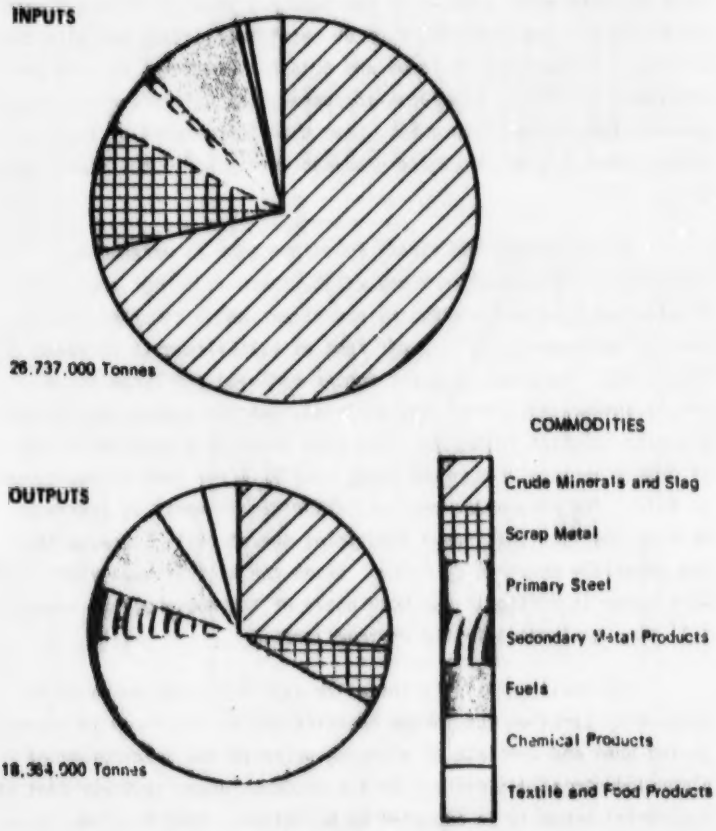


metal industries and other noxious activities tend to be areas that have already experienced industrial decline, whereas these industries have actively competed for space in Hamilton. Within the bayfront area the steel companies have important backward linkages, such as scrap metal processing and handling of crude minerals, and important forward linkages, such as metal fabricating and slag processing. An analysis of input and output commodities reveals the dominance of primary manufacturing activities as opposed to consumer product industries (Figure 5). Less than 20 per cent of input or output commodity tonnages are products unrelated to the steel industry.

Although many industrial functions such as warehousing, wholesaling and repair services exist, there is a high proportion of manufacturing and processing operations, which comprise 96.2 per cent of employment and 73.3 per cent of establishments surveyed (Table 3). The areal size and number employed are large for a single integrated, inner city district, yet the industries reflect a greater capital intensity. One also predicts a high percentage of female workers, but in the study area 87.4 per cent of employment is male. The reason for unusual labour requirements is attributable to the fact that heavy industries demand skilled trades that are generally acquired by males. Also, the high frequency of shift work makes it difficult for both heads of the household to secure full-time employment in the bayfront area.

One would anticipate intensive utilization of space in an inner city location due to the restrictions on expansion in a congested area and the lack of planning prior to the development of older industrial districts. In the bayfront area, 40.5 per cent of industrial property is occupied by buildings. This is higher than suburban locations but not nearly as high as other core areas,

Figure 5
INPUT AND OUTPUT COMMODITY TYPES OF FIRMS



Note: tonnages include liquid products.

Source: Interview Data.

despite small set-back requirements for buildings. However, 20.5 per cent is utilized for outside storage, a less capital intensive land use but one which typifies heavy industries that require raw material storage or outside processing. Fourteen per cent of industrial property is used for parking. In most inner city areas, demands on parking are reduced by public transit, but in the bayfront area it is estimated that 70 to 75 per cent of employees use their own vehicles. Consequently, parking is still a problem despite the space already devoted to it. Ten per cent of the land is in open space, reflecting the absence of undeveloped properties and the problem facing in situ expansion. The remaining property included 12 per cent for loading and access space and 3 per cent leased out.

Most of the bayfront area was developed before 1940, the exception being the eastern end of the study area. Many firms have remained in the area for a long time (the average for firms interviewed was 44 years), but there was evidence that some redevelopment had been possible by in situ expansion or relocation within the study area. Nevertheless, only 14 firms interviewed had their manufacturing or storage operations in multi-storey buildings, thereby eliminating major problems of inefficiency, obsolescence and renovation for inner city firms. Even most of the older structures have only one storey, because the manufacturing of heavy products like steel necessitated such designs.

The dominance of heavy industry, and particularly the steel industry, is very apparent from studying industrial characteristics. For an inner city location, the bayfront area possesses the region's major industrial base, 76.2 per cent of the region's manufacturing jobs, and a large spatially integrated industrial core which is generally atypical of other inner city industrial areas. Despite the obvious restrictions of an incompatible urban environment, the industrial area has experienced growth that is unparalleled by any

other Canadian inner city industrial area. This success is evident by the number of large companies that have remained in the area, although many located here more than fifty years ago. However, the primary reason for the bayfront area's growth lies with the rapid expansion of the Canadian steel industry and specifically Stelco and Dofasco. "Canadian steel production grew from 3.3 million tons in 1950 to 17.5 million tons last year" (Spectator, 1980a, 12).

Land Ownership and Expansion of the Steel Companies

Given the influences of the steel companies on both the port and the bayfront industries, many of the apparent anomalies are explained. The steel companies' demands for large quantities of raw materials from other regions dictate a port location. The numerous backward and forward linkages of the primary steel industry generate localization economies, and the resulting complex furthers the agglomeration of economic activities. Two problems still prevail: how did the steel companies reach such massive proportions within an inner city location; and why have agglomeration and urbanization diseconomies not exerted the decentralization forces that have caused the demise of other inner city areas? The answer to the former question is found in the land development processes that enabled the steel companies to monopolize the central waterfront. In turn, this has deferred decentralization tendencies, but as the following chapter contends, these inclinations do exist and are a latent problem which must be confronted.

In a competitive land market, residential and commercial uses can outbid traditional industrial activities in the inner city port locations. This is discernible in various cities that have witnessed industrial decentralization and changing land uses on the central waterfront. Accepting this as the norm, it can be stated that Hamilton represents an abnormal case due to imperfect competi-

tion in the land market. "But it is claimed ... that monopoly is unimportant in understanding most serious urban problems; poverty, poor housing, congestion, pollution, and inadequate public services result only to a minor extent from monopoly power" (Mills 1972, 130). It is argued in this paper that imperfect competition is essential in understanding the anomalous land-use development in the bayfront area.

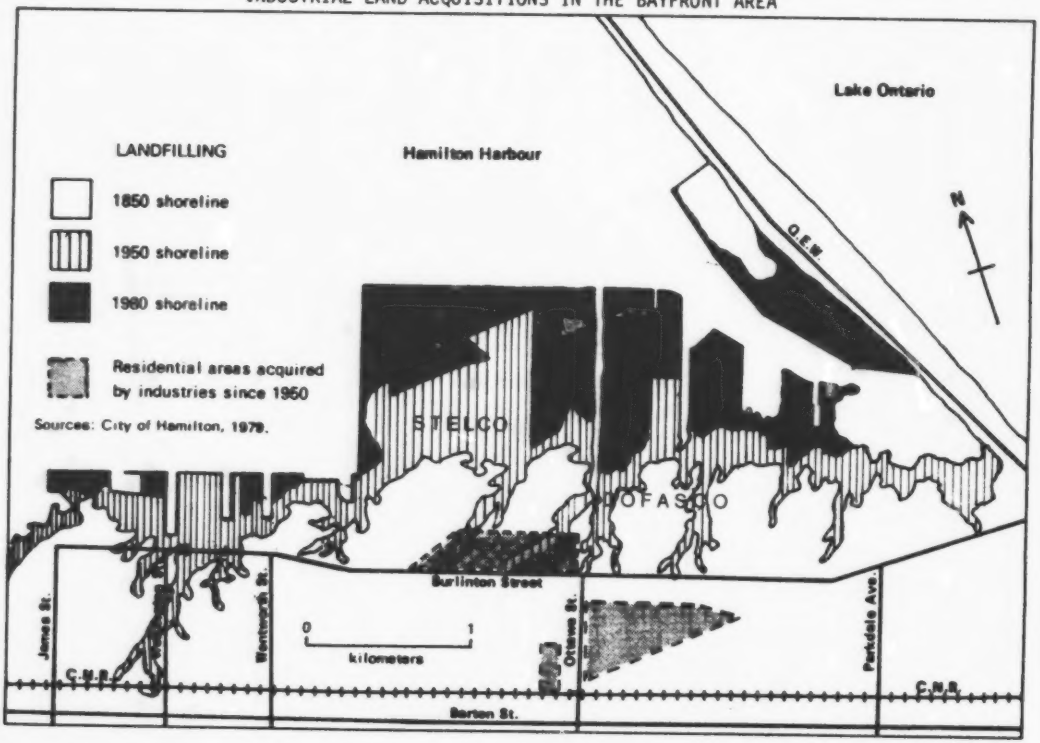
First, the historical process of land development on the bayfront is described in order to determine how oligopoly control was established. Second, the principles of imperfect competition are applied to show how land ownership has perpetuated oligopoly control and is responsible for the abnormal economic behaviour. The cycle theory of industrial growth maintains that industrial regions pass through a number of predictable stages which are called the 'law of industrial growth'; these stages included experimentation, rapid growth, diminished rate of growth, and stability or decline (Miller 1977, 65). Such an analogy can be useful to analyze the development of inner city industrial districts.

In the experimentation stage of Hamilton's growth (1870 - 1925), the key attributes for industrial location were port access and land incentives. The location of blast furnaces, a major growth industry, gave Hamilton recognition as a national industrial centre. The region offered good water and rail transportation, proximity to American and Canadian markets, cheap electricity and a growing skilled labour force that was supplemented by immigrants from Europe. Very soon other industries were agglomerating on the bayfront, especially branch plants of large American companies which bypassed tariffs to supply the Canadian market. During this time, Hamilton had its greatest industrial diversification and was competitive with Toronto for new industries.

In the period of expansion (1925 - 1965) the bayfront area changed dramatically. While most industrial sectors experienced growth from an expanding domestic consumer market, the steel industry underwent rapid development due to increasing industrial demands and by reducing the percentage of imported steel used in Canada. During the first twenty years most of the bayfront area was developed. Initially, the irregular shoreline permitted inlets to be filled in for additional waterfront property, but the steel companies' increasing requirements for land pushed the shoreline further and further north (Figure 6). This also facilitated the construction of newer port installations capable of handling larger lake vessels. Permission for landfilling operations was cordially granted by the H.H.C. who benefited from the sale of waterlots and the revenues generated by increased trade (Hewitt, 1977). Economically, landfilling was advantageous for the steel companies because slag by-products provided an inexpensive fill, and the northward landfill operations created adjacent properties with private access.

In 1950, Canadian steel mills were small by world standards, and the lack of scale economies enhanced the competitiveness of imported steel. However, technological improvements soon made large expansions feasible for Stelco and Dofasco. Increasing domestic demands for various steel products helped Stelco expand its diversification of goods such as pipe, rods, wire and fasteners. Dofasco became an integrated steel complex in 1951 when it introduced the first basic oxygen furnace to North America. This innovation produced steel faster, increased quality and reduced coke requirements. At the same time, the procurement of raw materials was enhanced by the completion of the Seaway, which gave large lakers access to Labrador ore, and the simpler cargo-handling procedures that self-unloaders and pelletized ore provided. However, to realize production objectives in Hamilton, both companies had to deal with the formidable task of land acquisition.

Figure 6
INDUSTRIAL LAND ACQUISITIONS IN THE BAYFRONT AREA



Landfilling still provided the best alternative for expansion although the cost of reclaiming deeper waterlots was steadily increasing. Besides the steel companies, landfill operations included the construction of piers 8, 23 and 24 by the H.H.C. and the reclamation of land at the eastern end of the harbour that was purchased by private industry, including Stelco. The eastern section of the study area (around Parkdale Avenue) was the last area to be developed that offered close proximity to the harbour or the steel industry. Industrial growth has since continued its eastward expansion into east Hamilton and Stoney Creek.

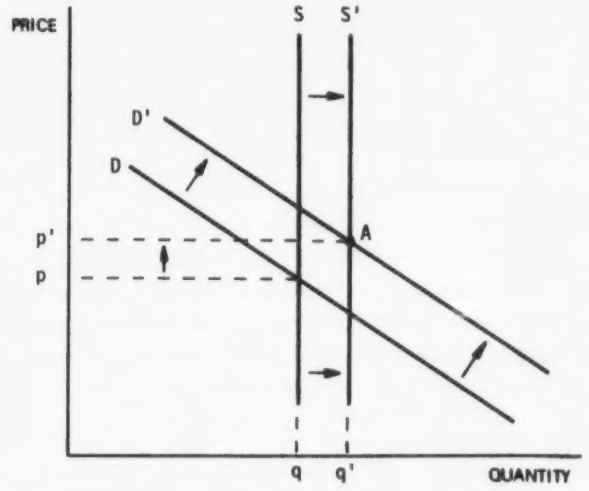
An alternative solution for industrial growth was to redevelop deteriorating residential districts. This provided short term, in situ solutions for most firms that required additional space, and provision was made by the City of Hamilton to enhance this process. "The elimination of the residential enclaves north of Barton Street for industrial use was first proposed by E.G. Faludi in 1947. (It was adopted by the original Official Plan in 1951.) Amendment No. 260 reaffirmed the merit of this proposal in 1969" (City of Hamilton 1977, 62). Many residential streets were purchased by the larger firms, especially the steel companies, but later expropriation of residential properties was prohibited. "Prior to the passage of the (expropriation) bylaw on June 26, 1960, Dofasco had already bought 144 other properties" (Spectator 1980b, 7).

The period from 1965 to the present is considered the stage of diminishing growth. The vacancy rate for land in the industrial core has remained very low since 1950, because both major methods of land acquisition, landfilling and purchasing residential lots, involved immediate utilization by the developer. These expensive business propositions were prohibitive for smaller firms but

remained economically feasible for the steel companies. Stelco's figures showed that "the costs of filling in a waterlot for use would range from a minimum of $74,600 an acre, if no dredging was required and the fill were free, to $883,000 an acre if fill was required for $6.00 a cubic yard. Simply putting the company's own materials in as fill would cost $270,000 an acre" (Spectator 1980c, 30). This latter figure was probably a realistic cost of land reclaimed in the 1970's. During that time, Stelco and Dofasco were permitted to expand to the existing harbour headline by swapping waterfront lots with the H.H.C., adjacent to the Beach Strip. (Figure 6). The City estimated that, "Land assembled from residential properties with lots averaging 25 feet by 100 feet amounts to some $300,000 per acre" (City of Hamilton 1977, 63). These high costs of land acquisition made the alternative of buying out other businesses more attractive. Around 1960, Dofasco purchased numerous residential dwellings and several firms in order to construct rolling mills and warehousing facilities.

Figure 7 graphically explains the effects of imperfect competition for industrial land in the short run. Since the supply of industrial land is relatively fixed in terms of zoning and availability, the supply curve facing industry is perfectly inelastic. Consequently, demand will determine the market price of industrial land. When new land is created by landfilling or the assembly of residential lots, the supply of land increases, but since the developer retains the land, the supply curve facing industries remains inelastic. In the last twenty years, the costs of acquiring land by these two methods have exceeded the market value of existing land. Firms which have no alternatives to expansion, like Stelco and Dofasco, will continue to acquire property at this higher cost.

Figure 7
COMPETITION FOR INDUSTRIAL LAND IN THE SHORT RUN



SS - Inelastic supply of industrial land.

S'S' - Increased quantity of land by landfilling or redeveloping older residential neighbourhoods.

A - Represents a cost of reclaiming land that is above market price p.

DD - Total demand curve facing industries.

D'D' - Increased demand curve reflects Stelco and Dofasco's requirements for expensive land reclamation.

p' - Increased price due to oligopoly control that affects demand and subsequently price when supply is perfectly inelastic.

These individual purchases go unnoticed in a competitive market, but under oligopoly conditions, the actions of one major landowner affect the demand curve for all the industries. Consequently, the price of existing bayfront industrial property becomes inflated to the extent that industrial uses can outbid residential or commercial activities. This explains the lack of competition from typical land uses on the central waterfront of other Canadian port cities. A contributing factor is that commercial or residential bid-rent functions are likely to be depressed by their nonconformity with heavy industrial activities. In contrast, firms that require heavy industrial zoning or proximity to steel producers are going to have higher than usual bid-rent functions. The major benefactors of oligopoly land ownership have obviously been Stelco and Dofasco, which have been able to achieve economies of scale and perpetuate their control over land ownership.

Stability or Decline

Although the cycle theory of industrial development followed a natural progression, it is acknowledged that the ultimate fate of industrial regions was variable. Similarly, inner city areas, which are all subject to decentralization, can be stabilized or possibly revived through unnatural processes such as municipal zoning by-laws or redevelopment schemes. In this study, evidence suggests that unnatural factors have already prolonged the industrial development of the bayfront area. The provision of land for spatial expansion is a key element for industrial stability because it enables firms to achieve and maintain economies of scale. Most inner city areas have competitive land uses or zoning by-laws that restrict industrial growth before scale economies are attained. Consequently, firms that desire physical expansion would relocate to a location where large-scale operations are possible. In the bayfront area, the early requirement of single storey facilities

for heavy industries permitted easier renovation of obsolete buildings without major disruptions in production or increasing demands for space. Meanwhile, landfilling and assembly of residential properties allowed an inner city location to double its areal size, while most other inner city industrial areas shrank due to competing land uses. As was discerned, the aggregate demand of industries for land was inflated by the steel companies, thereby outbidding alternative activities.

There are problems ahead which may lead to declining trends, perhaps not drastic for the primary steel industry or employment, but certainly significant for the total number of establishments and the diversification of the bayfront area. Two conventional land acquisition techniques have been severely restricted recently. The H.R.C.A., supported by the City of Hamilton and environmentalists, has objected to further landfilling of the harbour. This is not only to protest industrial expansion but to prevent further loss of: harbour area for recreational and aesthetic purposes; water volume for cleansing ability; and declining average depth which limits plant and animal life. Since the early 1800's, 2387 acres or 30.3 per cent of the harbour area has been reclaimed, the vast majority of which has been utilized for industrial or port development (City of Hamilton 1979, 42). The harbour has been polluted for three-quarters of a century but there is a concerted effort to improve its quality. Consequently, the only landfill operations currently approved are the H.H.C. renovation of pier 13 and plans for future piers 25, 26 and eventually 27, adjacent to the Beach Strip (Figure 2).

Residential enclaves have also been resisting industrial expansion. "Homeowners in the heavy industrial areas of Hamilton have been facing a problem in recent years. Because such areas

have been zoned for heavy industry, homeowners can't obtain permits to rebuild their homes. And, since individual properties are too small to be viable for industry it becomes difficult for owners to sell their land" (Spectator 1980c, 6). Certain residential neighbourhoods have disapproved of the zoning by-laws, arguing that they constitute a viable community. The most notable occurrence has been in the North End neighbourhood which has subsequently resulted in Amendment No. 200 to the Official Plan. More recently, other residential enclaves north of Barton Street have been re-evaluated (Amendment No. 260). The future of certain neighbourhoods is still unclear, but there is an effort to construct a zone of light industries to buffer residential areas from heavy industries. In the past, industries would encompass deteriorating streets which had once served as the only barrier between non-conforming land uses. The new row of dwellings replaces this barrier, perpetuating the decline of residential enclaves. One solution involves zoning restrictions placed on industries adjacent to residential areas. This change of zoning leaves existing industries in a difficult position because in situ or adjacent expansion plans may be thwarted.

Since land acquisition processes seem to be the catalyst for continued industrial growth in the bayfront area, the discontinuation of these processes may signal ultimate decline. Eventually all inner city industrial areas reach their limits of expansion; these processes simply delayed the inevitable in Hamilton. However, the prolongation of growth has enabled some firms to mature while other operations have achieved significant economies of scale, thereby reducing needs for future expansion of their Hamilton plants. Consequently, a mature industrial area is less vulnerable to decentralization. Unfortunately, some firms argue that no growth means decline; it is impossible to achieve stability.

Indications of decentralization tendencies are examined in the following chapter in an endeavour to perceive future development prospects.

Chapter V
PROSPECTS FOR THE BAYFRONT AREA

Introduction

Through unique land acquisition processes, the steel companies have undergone rapid expansion and have also fostered related industrial growth in the bayfront area. Despite this striking industrial development, it is presumed that decentralization pressures have also been present. These pressures have been less evident due to localization and agglomeration economies offsetting urban diseconomies and a decreasing need for proximity to conventional transportation terminals located near the city core, particularly the port. The declining comparative advantage of the bayfront location has resulted in diminishing industrial growth, but the main deterrent for existing firms has been the lack of room for expansion. This restraint can trigger the decentralization of firms and, in many ports, absolute industrial decline in the central waterfront area.

Lack of space is a common problem for inner city plants, but in Hamilton, constant demands for space and recent restrictions of land acquisition procedures have created severe shortages. Previously, the expansion of the steel companies occurred at the expense of waterlots and residential blocks, but the curtailment of these alternatives has increased competition amongst industrial activities. It has been demonstrated that oligopolistic competition leads to high cost areas, which tend to force out the small and medium-sized firms. Often, the steel companies have been the benefactors, while the bayfront area has become increasingly dominated by and dependent upon the primary steel sector.

Theories of Inner City Decentralization

The decentralization of industrial establishments from the inner city to suburban or non-metropolitan locations is a common phenomenon in the Western industrialized world. The theories for industrial decentralization are well documented and tend to follow two basic approaches: comparative advantage and the evolution of firms.

Comparative advantage involves competing forces: factors pushing industry from core areas; and factors pulling industry to suburban areas. Push factors include numerous disadvantages such as congestion, poor working environment, obsolete plants, and the high costs of land. Traditional inner city advantages of available labour, services, markets, materials and capital have been weakened by competition amongst firms in the core area. Initially, agglomeration provided localization economies, but as the core areas became congested, negative externalities has eroded these advantages. Pull factors include the advantages of low land costs, lower taxes, large planned sites, and adequate hard services. Suburban locations were made feasible by the changing technology in plant design and transportation innovations. The trend towards one-storey buildings, capital-intensive operations and integrated plants required more land, less labour, and fewer local linkages, making suburban sites attractive. Meanwhile, the availability of trucking services and the construction of expressways made it feasible for industries to exploit the rental advantages. Lever (1975) utilized factor pricing to show that firms in the inner city have difficulty reducing labour requirements, because the substitution of capital inputs is limited by the lack of space to expand. Also, if a firm moves from a high cost area to a low cost area, it can release capital that is tied up in existing facilities and put it to more productive use.

The "filtering down" theory of the evolution of firms states that firms experience three stages of growth and are subject to varying locational requirements during each stage (Erickson 1976). The first stage is incubation, when new firms require an inner city location to be close to the established parent industry for external and localization economies. "New firms are generated out of the existing industrial structure through the accumulation of technical and entrepreneurial skills" (Bater and Walker 1971, 12). Struyk and James (1975) found that small (young) firms tend to require rentable production space, physical capital, legal and financial services, and information on supply and demand changes. These frequently occur in the inner city.

The second stage is the product cycle whereby innovation, growth and maturation take place, during which time space and plant requirements become obsolete or inadequate. Relocation can permit technical improvements in plant layout, type of production and capital/labour utilization. "Evidence shows that young firms are more likely to relocate within the zone of origin, or nearby. This reflects the continuing need for inputs and services available in core areas" (Leone and Struyk 1976, 329).

Lastly, there is a filtering stage in which the plant size has greatly expanded and has lessened its dependence on localization and external economies. Consequently, firms are more footloose and can take advantage of less expensive peripheral areas which are better suited for large, integrated operations that serve large market areas. "Larger firms can move longer distances, perhaps because they are more independent of suppliers or buyers at a particular location" (Moses and Williamson 1966, 217).

The comparative advantage and the evolutionary approaches to industrial decentralization are very useful in comprehending the

relocation of individual firms. However, neither approach can account for the degree of decentralization in a particular area, especially an anomalous case like Hamilton. Consequently, there must be triggering factors that determine the intensity of relocation pressures; these factors are the key to predicting future trends in a particular area.

Direct Evidence of Decentralization

The purpose for examining recent relocations is to determine whether they represent natural filtering processes or whether they reflect decentralization pressures that are specific to the bayfront area. "Between 1966 and 1972, Hamilton experienced a decline in both numbers of small industrial firms and in the number of people in small firms" (Jackson 1974, 56). Despite a declining number of establishments in the bayfront area, total employment has generally increased. This implies that smaller firms have relocated or closed, while larger firms continue to expand their employment. The relocation of smaller firms could be dismissed as evidence of the product cycle, a typical evolutionary process. However, between 1970 and 1972, numerous smaller businesses were purchased by Dofasco for the expansion of its warehousing operations. Dofasco cordially aided the relocation of firms, mostly to other sites in Hamilton (Jackson 1974, 62).

Larger establishments have also relocated in recent years, but they do not simply reflect the filtering of maturing firms. Major losses have included Canadian Industries Limited, several oil companies, Thompson-Gordon, and Associated Springs (Wallace Barnes Group). C.I.L. probably relocated because: it had no room for expansion situated between Stelco and Dofasco; it preferred a rural location over an urban environment; and it made very limited use of the port facilities despite its waterfront location. The

purchase of this property by Dofasco will play a major role in the latter's expansion plans within Hamilton for the next twenty years. The decentralization of oil tank firms was previously accounted for by the discontinuation of lake shipments. Thompson-Gordon and Associated Springs were two important employers that derived inputs from the steel industry and preferred to remain in the bayfront area. However, their multi-storey plants were inefficient, room for expansion was very limited, and no alternate sites were available nearby. Both firms ultimately chose to relocate operations to Burlington. Very recently, another decision to relocate within the region was made. "E. D. Smith and Sons Limited of Winona, Ontario [sold] the Hamilton property of its McLarens Foods division to Dofasco Inc. ... for general office use and parts storage. E. D. Smith transferred its food processing operations to a new unit at its main plant in Winona" (Globe and Mail 1980a, B6).

These relocations illustrate common push and pull factors: urbanization diseconomies such as congestion, inadequate services, inefficient plant layouts, obsolete buildings and difficult access in the core area; and competition from attractive suburban sites in east Hamilton, Stoney Creek and especially Burlington. However, they have partially resulted from three extraordinary forces that prevail in the bayfront area. First is the lack of room for expansion on site, on adjacent land or elsewhere in the study area. Second is the formidable competition from the steel companies which has impelled firms to relocate and has resulted in their acquisition of many vacated properties. Third is the incompatibility of several industries with the heavy industrial activities and adverse environment.

These extraordinary forces have become increasingly powerful with the curtailment of land acquisition for non-industrial uses and

the planned expansion of the primary steel industry in the bayfront area. Stelco has virtually met its spatial limitations within Hamilton, so major expansion has been designated for the new greenfield operation at Nanticoke. However, Dofasco has postponed plans for a greenfield site since the acquisition of C.I.L.'s property, and Dofasco aims to double production capacity in Hamilton by the turn of the century. This explains the number of recent purchases of industrial properties that were proximate to Dofasco's operations. Consequently, it is perceived that decentralization of firms from the bayfront area is more likely to result from industrial growth rather than decline.

Problems of Location in the Bayfront Area

One method to measure decentralization pressures on existing firms is to identify the perceived disadvantages and advantages of a bayfront location. One would generally expect the advantages to outweigh the disadvantages because firms have chosen to remain in situ. However, given the inherent problems of inner city areas, significant disadvantages could signal future decentralization tendencies.

Table 4 lists the main problems with sites and the industrial environment. The most frequent responses included: lack of room for expansion; vandalism; poor working environment; conflicting land uses; high labour costs; obsolete, inefficient buildings; and expensive land costs. Problems involving the industrial environment suggest incompatibility between heavy and light industrial activities. The steel companies' oligopolistic control of land and labour markets has contributed to the high costs of these factors. The low frequency of responses for transportation, market or input problems implies that firms are satisfied with the movement of goods.

Table 4
DISADVANTAGES OF HAMILTON LOCATION/SITE

MOST FREQUENT INDIVIDUAL RESPONSES

	Number of Responses	Percentage of Total Responses
- Lack of Room for Expansion	26	15.3
- Vandalism	25	14.7
- Poor Working Environment	15	8.8
- Conflicting Land Use	15	8.8
- High Labour Costs	13	7.6
- Obsolete Inefficient Buildings	10	5.9
- Expensive Land Costs	8	4.7
	112	65.8
- No Problems	13	-

AGGREGATED RESPONSES

	Number of Responses	Percentage of Total Responses
- Poor Environment	70	41.2
- Site Characteristics	57	33.5
- Labour	23	13.5
- Transportation	12	7.1
- Markets	5	2.9
- Input Sources	3	1.8
	170	100.0

Most transportation complaints dealt with local access difficulties, such as congestion on Burlington Street and on the Skyway Bridge.

Many of the disadvantages mentioned can be attributed to urban diseconomies that prevail in inner city areas or agglomeration diseconomies that accumulate in large industrial districts. The latter problem is particularly relevant to the heavy metals complex in Hamilton. It can also be stated that these disadvantages typify problems that have lead to the decentralization of firms in other cities. However, these findings do not necessarily suggest an immediate trend for the out-migration of industry because they only confirm a process that has existed for some years. Bater and Walker (1971) noted expensive labour and lack of space for expansion as major disadvantages, while less frequent problems included a small local market, lack of skilled labour, unpleasant local environment and high local taxes.

Table 5 shows that the Hamilton location still possesses its traditional attributes: market proximity, good transportation (especially trucking) and promixity to material inputs. Perhaps it is peculiar that transportation advantages rate so highly, regardless of inner city congestion. This is likely influenced by the important role that transportation requirements play in procuring raw materials for heavy industries and distributing products to provincial and national markets. Also, many of the firms interviewed did not operate trucking fleets, so their responses reflect good transport services rather than the problems of local accessibility incurred by trucking companies. The availability of a skilled labour force, heavy industrial zoning, and leased property were noted as secondary attributes, but only six firms mentioned sufficient room for expansion. Other agglomeration economies were evident: the industrial attributes of the inner city

Table 5
ADVANTAGES OF HAMILTON LOCATION/SITE

MOST FREQUENT INDIVIDUAL RESPONSES

	Number of Responses	Percentage of Total Responses
- Good Road Transport	34	13.6
- Local Market Area	24	9.6
- Inputs from Steel Industry	18	7.2
- Outputs to Steel Industry	15	6.0
- Available Labour Pool	15	6.0
- Central to Ontario Market	15	6.0
- Access to Rail Siding	13	5.2
	134	53.6

AGGREGATED RESPONSES

	Number of Responses	Percentage of Total Responses
- Transportation Requirements	65	26.0
- Market Access	65	26.0
- Input Sources	45	18.0
- Labour Requirements	28	11.2
- Site Characteristics	23	9.2
- Industrial Environment	17	6.8
- Other	7	2.8
	250	100.0

core favoured heavy industries; and the concentration of industry provided the centre of activity for industrial service activities.

From these findings, one would deduce that localization economies and conduciveness to a heavy industrial environment have offset any disadvantages the bayfront area possesses. Proof of the latter is that 23 firms require heavy industry zoning and prefer to blend in with the surrounding activities to minimize adverse public images. However, 15 firms are significantly inconvenienced or harmed by air and noise pollution and non-conforming industrial activities. For these and other establishments, localization economies must override all locational disadvantages or relocation would appear imminent. This supposition can be tested using market and supply area analyses.

Input and Output Linkages

One would expect the bayfront steel complex to generate many local input and output linkages. However, only 12.3 per cent of input tonnage is derived within the study area and only 5.1 per cent from the Hamilton area (Table 6). The majority of these local inputs come from Stelco, Dofasco and Burlington Steel. These shorter linkages are small in relation to the large quantities of raw materials that are procured from sources elsewhere in Ontario, Eastern Canada and the United States, which account for 75.7 per cent of input tonnage. Tonnages bias results in favour of the larger firms that utilize heavy input commodities, such as iron ore and coal. Excluding coal and ore, local origins comprise 46.5 per cent of input tonnage. Input linkages were also evaluated for each input commodity and origin that occurred. By this method, 15.1 per cent of commodity linkages are within the study area, 10.3 per cent are derived from the Hamilton area, and another 19.6 per cent from the

Table 6
SUPPLY AND MARKET AREAS

Commodity Origins/ Destinations	Inputs		Outputs	
	Tonnes	Linkages	Tonnes	Linkages
STUDY AREA	3,036,750 12.3%	92 15.1%	3,221,771 19.2%	40 7.7%
HAMILTON AREA	1,260,253 5.1%	63 10.3%	2,778,582 16.5%	113 21.7%
GOLDEN HORSESHOE	1,349,088 5.4%	120 19.5%	868,088 5.2%	54 10.3%
REST OF ONTARIO	8,926,986 35.9%	106 17.3%	3,236,961 19.3%	103 19.7%
REST OF CANADA	3,214,674 12.9%	83 13.5%	5,359,769 31.8%	140 26.8%
UNITED STATES	6,624,909 26.6%	94 15.4%	894,591 5.3%	48 9.2%
OVERSEAS	447,369 1.7%	53 8.7%	452,552 2.7%	24 4.6%
TOTALS	24,860,029 100.0%	611 100.0%	16,812,314 100.0%	522 100.0%

Source: Interview Data.

Golden Horseshoe region. The higher totals account for numerous secondary inputs that are obtained from surrounding centres, particularly Toronto. However, most steel is fabricated outside the study area, which explains the lower occurrence of internal linkages.

Total output tonnage is only two-thirds of input tonnage due to the weight-losing processes of the primary steel industry and other raw material-using industries (Table 6). Of output tonnage, 19.2 per cent remains in the study area and another 16.5 per cent goes to the Hamilton area. Half of the locally bound tonnage includes large quantities of scrap metal destined for the steel companies and slag products generated by the steel companies. In terms of total commodity linkages, this represents a meager 7.7 per cent. However, in the remaining Hamilton area, 21.7 per cent of total commodity linkages occur which include consumer goods that are marketed to the surrounding population of 500,000. The vast majority of output tonnages and commodity linkages are marketed throughout Ontario and across Canada. This reflects the large number of national and multi-national companies that produce for the whole Canadian market. Stelco and Dofasco are the largest, but other examples include Procter and Gamble, Firestone, International Harvester, Canadian Westinghouse, Otis Elevator, American Can, and Bridge and Tank.

Not all these statistics suggested that there were particularly strong localization economies so further investigation was required. Closer analysis of backward and forward linkages with the primary steel industry revealed that 45 firms had direct linkages that were considered to be of major importance (i.e., more than 30 percent of the firm's input or output tonnage). Of these 45 firms, 21 had major inputs, 13 had major outputs and 1 had major inputs and outputs. Another 10 firms had more than 10 percent of their input

or output tonnage linked to the steel companies. In addition, 7 firms, excluding the aforementioned, had major linkages with secondary metal industries. Therefore, a total of 62 firms derived significant localization economies from the steel industry.

In summary, it can be stated that the bayfront industries are generally basic activities that produce for markets beyond the Hamilton area. Bater and Walker (1976) have concluded that local linkages in the steel industry are not strong because most fabrication takes place outside Hamilton (or within the integrated operations of the steel companies). However, this does not lessen the locational interdependency of firms with the bayfront steel complex. Consequently, localization economies have been instrumental in maintaining the concentration of the majority of industrial activities in the bayfront area.

Causal Factors for Relocation

It appears that theories of inner city decentralization are inadequate to explain or predict the locational stability of firms in Hamilton's bayfront area. Certainly the comparative advantages favour newer suburban sites in Stoney Creek and Burlington without depleting localization economies, but there has not been a corresponding out-migration of firms. Since inner city problems have been apparent for many years, it is impossible to determine when severe decentralization might occur, if ever, using the comparative advantage approach.

The use of an evolutionary approach is also inappropriate because the bayfront area does not exemplify this theory. Numerous firms have passed through the product cycle and matured with little occurrence of filtering processes. Indeed, land acquisition processes have enabled larger firms to continue expansion within the

bayfront area. One could also argue that multi-national branch plants do not fit the model because capital was available to purchase larger sites than required and because technological innovations were tested in advance by the parent company which enabled a smoother evolution of the branch plant.

A more flexible, inductive approach is required to consider the mechanisms that motivate plant relocation, and hence, decentralization. Causal factors refer to the competition for space which is influenced by the availability of land and the spatial requirements of firms. Therefore, a critical condition results when a firm desires physical expansion of a plant on a site that possesses no room for expansion. Several options are available to the firm:

1) no expansion, which may be detrimental to the firm's competitive position;

2) expansion to an adjacent site, often the best short term alternative, but one that can involve costly land acquisition or can be impossible in densely built-up areas;

3) expansion in situ, although physical expansion is impossible, production can be increased by adding labour and capital inputs and reorganizing production lines;

4) branch plant, which permits the rationalization of production runs at separate plants and provides better market coverage, but can result in the duplication of plant, machinery and staff;

5) relocation of warehousing operations, which releases plant space and retains spatially integrated manufacturing operations; and

6) total relocation, which can be undesirable in terms of moving costs, plant start-up, loss of employees and loss of customers, but which enables improvements in location, plant layout, production runs and labour/capital ratios.

The feasibility of these options varies according to the company organization. Multi-plant firms can close or transfer inefficient inner city operations, whereas single-plant firms find it more difficult to bear the costs of relocation or starting branch plants.

It is postulated that those firms that are experiencing growth and lack room for expansion, particularly single-plant firms, will potentially have to decentralize part or all of their operations. To justify this statement, firms were questioned on their site preferences: do they prefer their present site or an alternative site/location? The results showed:

1) 46 would stay, although 11 clearly had no space for a major expansion;

2) 46 would move, of which 18 had no space to expand and 14 had limited space;

3) 9 would prefer the existing site if more space was available; and

4) 4 were uncertain but mentioned alternative locations.

The reasons listed by firms that selected the present site reflected the advantages given previously, such as good transportation, proximity to markets and convenient input sources. However, concerning the firms that would move, most responses (40) stated site problems, notably lack of space (19 responses) and site congestion, which caused loading and parking difficulties. Of lesser importance were transportation problems, such as poor local access and road congestion, and problems with the environment, such as non-conforming land uses (with residential and heavy industrial uses), poor working environment, and environmental restrictions on heavy industrial activities.

One would reason that lack of room for expansion, site congestion, local transportation issues, and conflicts with adjacent land uses have important impacts on locational decisions. On the other hand, certain problems mentioned previously do not appear to influence locational behaviour. Vandalism, for example, was mentioned by 25 firms, but only 1 firm noted it as a reason to move. Apparently vandalism is viewed as a problem that can be combatted or is unavoidable in industrial areas to a certain extent. Similarly, the high costs of labour and land were disadvantages that had to be borne at an inner city location. Even labour relations, which were often strained, did not appear to influence locational preference because conditions typified industry in general, not Hamilton.

Since the major motivating factors for relocation include site characteristics, congestion problems and conflicts with the surrounding environment, their locational preferences for the Hamilton region should persist. Of the 52 firms that mentioned alternative locations, 5 still preferred the study area, 12 chose Hamilton and 25 selected Stoney Creek, Burlington or the Hamilton Region. Only 10 firms desired locations outside the region, and they were commonly the result of shifting market conditions. Despite the hypothetical nature of these responses, they do show a clear tendency for firms to remain in the same region to retain customers, employees, services and transportation connections, and to utilize their knowledge of the local business community.

The costs of relocating must be very prohibitive in the short run because half of the firms interviewed are not at their perceived optimal location. This supports the notion that most decisions to move are made out of necessity rather than choice, such as the physical requirements for expansion. Following this

path of reasoning, firms were probed for their growth potential in the next ten years. Those firms that were spatially restricted would have to choose alternatives to in situ expansion.

Indirect Evidence of Decentralization

Expansion decisions were cross-tabulated with plant types and spatial limitations to expansion, as determined from present site utilization. Fifty-nine firms expected some form of expansion in the next ten years; 10 had just expanded at the present site; 32 expected no expansion; and 4 were uncertain. Of the firms expecting no physical growth, most cited poor market conditions and inadequate physical plant capacity to meet demands and to remain competitive with other producers. Other reasons included consolidating production in Hamilton and rationalizing operations.

The 59 firms that envisaged expansion were analyzed to determine the likelihood of decentralization for firms that had spatial limitations to growth (Table 7). Two-thirds of the firms had no room for expansion or had limited space for minor improvements of facilities. It is clearly evident that most firms that possessed adequate room (16 respondents) would choose in situ expansion. Only 3 firms mentioned growth outside the region, but these plans included new market centres and therefore cannot be considered typical of decentralization tendencies.

Of the firms that were spatially restricted, 10 firms also foresaw in situ or adjacent expansion, but this only included one-quarter of respondents. Faced with restrictions to growth, 40 percent of single-plant firms still chose in situ expansion, whereas 16 percent of multi-plant firms did the same. This suggests that alternatives are more difficult for single-plant firms to undertake. Half of the respondents (20) decided to relocate operations or start

Table 7
THE PLANNED EXPANSIONS OF 59 FIRMS

Type of Expansion	SPATIALLY LIMITED 40 Firms				NO SPATIAL LIMITS 19 Firms			
	Single Plant	Area Branches	National Branches	Total	Single Plant	Area Branches	National Branches	Total
In Situ	6	2	2	10	4	4	8	16
Relocate or New Branch in Area	7	7	6	20	0	0	0	0
Relocate or New Branch Beyond Area	1	2	2	5	2	1	0	3
Expand at Existing Branch	0	1	2	3	0	0	0	0
Decentralize Warehousing	1	1	0	2	0	0	0	0

a new branch plant within the area. These responses are combined because many firms considered both alternatives and because a local branch plant can often lead to the ultimate transfer of existing operations. Only 5 firms selected locations beyond Hamilton. Most of these included a new branch plant, which would have less impact on existing operations because these expansion plans were induced by new markets or supply sources. The alternatives that do imply partial decentralization include expansion at existing branch plants and the separation of warehousing and distribution functions from the main plant.

There appears to be proof that the lack of room for expansion can trigger decentralization whether push and pull factors are evident. In contrast, of 35 firms that were not expanding, only 8 had considered decentralization. Most of these had spatial congestion, and all but one had previously noted a preference for a new site or location. However, these firms can take longer to make locational decisions, whereas the 40 firms that lack room for planned expansion may be forced to make locational decisions within ten years. Some of these firms will likely restrict growth to presently available space. Others may relocate, releasing property which could enable existing firms to remain in the bayfront area. Although an accurate prediction of decentralization is impossible, competition for space largely influences the outcome.

Concern for the Bayfront Area

The inherent problem of inner city industrial areas is that spatial restrictions contradict the dynamic growth requirements of firms. As a result, the need for areal expansion necessitates the displacement of existing activities. Relocation has often been enhanced by agglomeration diseconomies and the requirement of growing firms ultimately to obtain a site that permits a matured plant

size. However, in Hamilton, land acquisition processes postponed inevitable spatial restrictions enabling many key industries to reach the matured stage of development (Table 8). The restriction of space occurred after several large firms realized economies of scale or faced a matured market. These firms are locationally stable because growth occurred slower, or in the case of the steel industry, growth led to greenfield operations. The retention of these firms has maintained localization economies that provide the basis for smaller firms to agglomerate within the inner city. Consequently, there has been continuous demand for the bayfront location, while other inner city areas have lost propulsive industries and suffered absolute industrial decline.

Since decentralization in the bayfront area does not reflect industrial decline, the loss of firms will not have a severe impact on employment, business activity or the industrial tax base. In the past, the loss of one firm was offset by the expansion of existing firms that subsequently generated more business, employment, tax revenue and incomes. Also, the expansion of existing firms further ensured the firms' locational stability for several years.

Since most relocations take place within the same region, the reallocation of businesses and employees has minimal adverse effects while enabling additional growth at the previous site. Any shift in tax revenue is usually minimized by regional government. There is even evidence to suggest that employees are modestly inconvenienced by the suburbanization of industry because most workers currently drive to work. This could permit families to relocate from the congested and polluted core area to suburban and rural locations with only moderate increases in living costs.

The major concern arising from the reallocation of economic activities is that the recipient of many industrial moves has been

Table 8
DEVELOPMENT OF INNER CITY INDUSTRIAL AREAS

Stages of Development	Theoretical Inner City Industrial Area	Hamilton's Bayfront Industrial Area
INITIATION	·Major Location of Firms ·Diversified Industries ·Various Sizes and Types of Firms	·Major Location of Firms ·Diversified Industries ·Various Sizes and Types of Firms ·Several Foreign Branch Plants
EXPANSION	·Physical Limitations to Growth ·Growing Firms Decentralize ·Loss of Basic Industries and Linkages ·Younger Firms (Locationally Active)	·Spatial Expansion of Area ·Freedom of Entry and Exit of Firms ·Growth of Steel Complex ·Various Sizes and Types of Firms
MATURITY	·Vacant and Deteriorated Sites ·Location of Noxious Industries ·Continued Decentralization of Firms ·Attraction of Proximity to Core	·Physical Limitations to Growth ·Matured Firms (Locationally Fixed) ·Decentralization of Smaller Firms ·Localization Economies Persist
PROSPECTS	·Declining Industrial Activity ·Competition from Alternate Uses ·Declining Employment and Tax Base ·Probable Redevelopment	·Stable Industrial Activity ·Competition Amongst Firms ·Stable Employment but Fewer Firms ·Increasing Dominance of Steel

the City of Burlington which lies outside the Regional Municipality of Hamilton-Wentworth. Direct access to the Queen Elizabeth Way, closer proximity to Toronto and suitably planned and serviced sites have attracted light manufacturing, warehousing and distribution activities away from Hamilton. Today, there is a growing trend towards the separation of administrative and research functions from manufacturing operations. There is evidence that firms in the bayfront area are moving office functions either into downtown Hamilton or to suburban areas that offer conducive environments. Again, the City of Burlington is especially attractive because many executives currently reside in the area. This trend could have a significant impact because 21 per cent of employment in the bayfront area consists of managerial and clerical positions. The reduction of these numbers would add to the 'lunch bucket' image that already plagues Hamilton.

It is obvious that the prospects for the bayfront area imply little alteration of land uses. The area will continue to be a major generator of employment for the region. The expansion of port activity will depend largely upon the growth of the steel industry. Increased demands for recreational and residential activity on the waterfront will still be repelled by the competition from high value industrial activities. Recreational uses are currently favoured on the Beach Strip and the Burlington shore of the harbour. Residential activities will persist in the larger neighbourhoods that surround the bayfront industries. They provide a restraining barrier for industrial development, but the interface of these incompatible activities will create major conflicts. However, the small, less viable residential enclaves which have deteriorated will eventually be converted to industrial uses for the betterment of all concerned.

Within the industrial complex itself, the primary steel industry will increasingly dominate land area, activities and employment. Although many secondary metal linkages are generated in Hamilton, the majority of forward linkages have benefited other centres in southern Ontario. Meanwhile, Hamilton has borne the brunt of sacrifices, in terms of air quality, water quality, residential [illegible]-ment and the diminishing harbour area. The steel companies even exerted pressure on other industrial activites, causing them to relocate. Some have relocated in the wake of the steel companies' expansions. More have been indirectly induced to decentralize by the lack of space for expansion and the high land values which permit capital gains when relocating to low cost suburban areas.

The net result will be a declining number of firms and diminishing diversification of industry within the bayfront area. Lack of diversification generally infers economic instability because the area is vulnerable to the decline of one sector. Most employment, income and business is tied to the steel industry, so a decline would be felt throughout the whole regional economy. The primary steel industry is a slower growing sector in industrially advanced countries. The Hamilton region has already experienced relative economic decline and stagnating population growth. Consequently, more emphasis should be put on the rapidly growing high technology industry.

The replacement of older industries with new specialities is more difficult in an area that is dominated by one sector, whereas a diversified centre provides a variety of external economies and services that attract a wide number of industries. Older industrial facilities become harder to adapt to technological changes, and entire operations may eventually have to be phased out. In a specialized centre, employment and skills are geared to one industry.

thereby restricting the range of employment opportunities. In general, the region is less flexible to change.

From a socio-economic standpoint, the lack of diversification tends to gear community services and institutions to one industry rather than providing the wide range of social amenities that usually evolve with urban agglomeration. Until very recently, Hamilton experienced slow growth of its service sector and its cultural institutions. One cannot ignore the similarities in development between Pittsburgh and Hamilton. "For historical and structural reasons already set forth, the Pittsburgh region has never quite 'grown up to its size' in the scope and quality of many types of businesses and public services, cultural and educational facilities, diversification of business, internal transport, and regional coordination of purpose and planning" (Hoover 1964, 60). The lack of foresight in Pittsburgh has resulted in three decades of economic depression and continuing efforts to revitalize the area. Hamilton should attempt to decrease its dependence on the steel industry before the local steel plants face tougher times.

Chapter VI
RECOMMENDATIONS AND CONCLUSIONS

In the past, two governing bodies have greatly influenced industrial development in the bayfront area. The H.H.C. have controlled landfill operations and the ownership of reclaimed land, while the City of Hamilton has shaped inland industrial expansion by implementing zoning changes. In the future, both of these authorities must coordinate their efforts if Hamilton is to reinstate progressive development. Proper allocation of vacant property will be imperative to satisfy the dynamic land requirements of industry and to prevent the decentralization of many firms. Their primary goals should be to retain the present industrial complex in the bayfront area while striving for greater diversification with Hamilton-Wentworth.

Recommendations for the Port's Role

The expansion of the primary steel industry will continue to propel port activity, whereas other port functions and industries show less promise for growth. The port of Hamilton cannot elude the trends of declining port manufacturing, but an effort should be made to retain existing port users. A key factor in remedying this problem involves the future development of piers 25 and 26 by the H.H.C. Created by dredging operations within the harbour, this land has been designated for shipping and marine-related uses.

At present, available H.H.C. property is very limited, but some is not utilized for marine activity, some is under-utilized and the aggregate demand for port facilities is not growing. However, certain port users have inadequate sites that require additional back-up land, better accessibility, better services, longer docknalls or slips with deeper draught. The availability of undeveloped waterfront property can provide the flexibility that enables reallocation

or consolidation of existing port activities. In turn, port users would face fewer constraints, operate more profitably and reaffirm their selection of a port location. A redistribution of port facilities appears imminent. The redesignation of pier 8 for recreational and commercial uses establishes a policy to relocate port installations to the eastern end of the harbour. This proposal is acceptable because it would separate recreational and industrial activities on the waterfront, and it would enable better road access to general cargo terminals. However, increased vessel traffic in the eastern part of the harbour may hinder docking procedures at certain piers unless approaches are realigned.

The availability of new dock space also provides sites that may attract new or expanded port functions. However, the H.H.C. should not construct facilities in speculation of new trade. External factors have largely determined trends in port manufacturing and general cargo movements. Such factors that could be beneficial to the port of Hamilton include: increasing the capacity of the Seaway; lengthening the shipping season; applying preferential rail rates for Great Lakes ports; instigation of a general cargo feeder service; and lowering Seaway tolls (Ontario Ministry of Transportation and Communications 1981). These changes could increase Hamilton's competitive position, generate new trade and reduce land requirements for stockpiling raw materials, especially for the steel companies. Unfortunately, Hamilton can do little to bring about these changes.

Presently, conditions are good for exporting because cheaper energy costs and the devalued dollar make Canadian products more competitive. New international markets should be sought and bilateral trade agreements negotiated, particularly with Third World nations. Both the provincial and federal governments have instigated policies to increase exports of manufactured goods. "In 1980,

Larry Grossman, Ontario Minister of Industry and Tourism, announced a $25 million program to boost the provinces exports" (Spectator 1980d, 31). "Last year, the Government set up the Ontario International Corporation, a small Crown corporation designed to increase the province's visibility in the world market for major capital projects. The Government's strategy centres on finding new markets rather than trying to enter established ones dominated by West Germany, Japan and the United States" (Globe and Mail 1980b, B33). "Other (federal) policy proposals include a much expanded export effort, including the establishment of a national trading company, more competitive export financing, possible tax incentives for exports and a much more sophisticated targeting of Canadian export markets" (Toronto Star 1980b, D8). Many firms lack experience in international shipping, but industrial liaison could minimize uncertainty and risk. A regional authority could play an active role in promoting local industries and helping them pursue overseas opportunities, with particular focus on the port of Hamilton.

Recommendations for the City's Role

The City of Hamilton will have to take a decisive role in the development of the bayfront area. Now that physical industrial expansion is severely restricted, the City must ensure an equitable allocation of land uses that will maintain the locational stability of firms. This will involve the loss of some firms in order to permit the dynamic growth of others that are better suited to the bayfront area and provide more benefits to the community.

It is maintained that the steel companies have sufficiently large operations to derive adequate scale economies within Hamilton. Consequently, restriction of further expansion would have less impact on the locational stability of Stelco and Dofasco than it would have on other firms. The steel companies should therefore be

restrained from purchasing additional property in the bayfront area. The resulting higher vacancy rates and the lower land prices would permit feasible locational alternatives for expanding firms or new firms.

Zoning modifications are required to improve land-use compatibility in the bayfront area. Planning amendments for residential enclaves sanction the creation of buffer zones to conceal industrial activities. The principle is good, but in the past, inadequate protection was given to the adjacent row of housing, and now inconsistent building and land-use restrictions can be enforced on older industrial establishments which curtail expansion plans. For residential neighbourhoods that have deteriorated and are not considered viable, expropriation would benefit both the occupants and nearby industries. The City could undertake landbanking in order to amalgamate or divide properties into suitable industrial sites. Such land development schemes are preferable to individual acquisitions, which are more costly to purchase, difficult to service and perpetuate unplanned industrial growth.

The City can prevent the adverse decentralization of industries by understanding and acting upon the locational requirements of existing establishments. It should strive to accommodate firms that definitely require a bayfront location and firms that generate numerous backward and forward linkages within the region. Also, firms that speculated relocation outside the Hamilton-Wentworth region (e.g., Burlington) due to spatial restrictions should be given special attention. At the same time, it is recommended that an attempt be made to sustain and improve the mix of industrial types, especially between light and heavy industry. The increased dominance of heavy industries repel local consumer product establishments, tend to be less stable in the long run, and would inflict impermissible impacts on an area that has already been subjected to

environmental damage. An integrated mix of industries generates economic stability which beneficially enhances employment and business in the area.

Spatial requirements have been found to trigger the movement of firms because most plant relocations involve short distance moves. Regional locational attributes change slowly, but site advantages deteriorate faster. Site problems, such as inefficient plant layout, outdated production runs, insufficient parking space and inadequate loading areas, make in situ or adjacent expansions uneconomical or impossible. The local governments should provide incentives for plant renovations, additional off-street parking, and the rationalization of production to better utilize the existing plant. A last alternative is to promote new branch plants in the area which would allow some production to remain at the existing site. Older buildings that are vacated could be renovated into smaller rental units to attract new establishments. Other concerns include inadequate municipal services in older areas, poor air quality, incompatible industrial uses and transportation problems.

Transportation Issues

Many secondary complaints focused on transportation issues such as congestion, poor inner city access, inadequate regional roads, poor road maintenance and inconvenient rail service. Currently, construction is planned for the eastern end of Burlington Street and the Burlington Skyway which should alleviate congestion on the most heavily utilized roads. However, both schemes perpetuate traffic patterns rather than provide suitable routes through the core or to regional centres not accessible from the Q.E.W. Most alternate truck routes pass through residential, commercial and institutional zones. The one-way street system in the central city was a short term solution to traffic congestion, but this solution has limited future expansion alternatives which are required soon.

Consequently, the proposed perimeter road must be given strong priority because it would provide: an important westbound truck route that avoids the downtown streets; a release valve for traffic congestion on Burlington Street; and better accessibility to the western port facilities. The proposed mountain expressway (Red Hill Creek) will become more valuable to the bayfront industries as growth spreads southwards to the Mountain Industrial Park and to Nanticoke.

The construction of the 401 expressway diverted growth from the Highway #2 corridor from Hamilton to Woodstock, although the completion of the 403 will replace the older route. Hamilton also lacks proper highways to prosperous centres like Kitchener-Waterloo, Cambridge, Guelph and Brampton. Major provincial road improvements have tended to divert traffic around Hamilton, rather than serve regional needs. Highway #6 to Guelph (currently undergoing improvements) and Highway #8 to Kitchener are two older routes that badly require upgrading. Such regional transportation improvements could help to reconcile industrial development that presently has stagnated within the city of Hamilton.

Modal splits are not likely to alter in the near future. Waterborne shipping is basically geared to bulk cargoes, rail transport only provides adequate direct service to large users, and trucking is efficient and convenient for inter-provincial shipments. However, these transportation networks will have to be reevaluated as rising energy costs alter modal efficiencies.

Conclusions

The processes that led to the unusual development of Hamilton's bayfront area can be adequately rationalized using economic theories, despite the area's lack of adherence to locational

models. Yet Hamilton offers little promise as the epitomy for inner city port development. Firstly, the prosperous growth of port tonnage and the majority of activity are generated by one industry that still demands direct port access. Consequently, Hamilton provides no solutions to the declining trends in port manufacturing. Secondly, the bayfront area is not immune from industrial decentralization, and there will continue to be business relocations. However, with proper planning and inducements, the loss of firms will result in additional industrial expansion rather than simply the dispersion of economic activities. Even though the decentralization of firms may be considered a natural and unavoidable phenomenon, the absence of spatial restrictions at an early stage of development can ensure greater economic stability. Therefore, the absolute decline and deterioration of inner city industrial areas can be avoided theoretically, but few cities have opportunities for spatial expansion similar to Hamilton.

The existence of the primary steel industry within an inner city location is unique and accounts for previous industrial growth and current stability. This is explained by the localization economies that maintain an industrial complex. However, the environmental sacrifices may be too high a price to pay for prosperity. In the future, economic dependence on the steel industry may undermine Hamilton's prominent industrial development unless greater efforts are made to regain a diversified industrial base.

Studies on port manufacturing and inner city decentralization often take case study approaches because general theories are lacking or incompatible. Such an approach is useful to interpret problems that occur at specific locations, but solutions are not always evident. A wider perspective should be taken to generate common solutions to similar problems. In particular, the general decline

of port-city linkages is a national concern that has implications for port employment, value added to waterborne commodities, and local revenue generated by port activity. Port installations are becoming autonomous from urban activity and have little significance as regional growth poles. Nanticoke proves that this is true for industrial ports as well.

Another area that demands continuous study is the Great Lakes shipping industry. Its involvement with overseas shipping is currently threatened by congestion at locks, high tolls, competition from coastal ports, small vessel limitations and a short shipping season. One factor that has not been considered is the infrequent utilization of overseas markets by domestic industries. The feasibility of increasing exports of manufactured goods should be evaluated. Canadian industries may be competitive in some products today but how can they best ensure their future stability.

With respect to industrial development, Hamilton's metal complex has been widely studied. However, the growth of the steel industry occurred at the expense of other industries and land uses. This must be acknowlecged as a unique factor in the decentralization of firms from the bayfront area. A final issue that requires more attention is the separation of management, administrative and research functions from manufacturing activities. This trend can have severe impacts on the distribution of employment and wage levels within different parts of the city or region.

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Appendix A
LIST OF FIRMS INTERVIEWED

LIST OF FIRMS INTERVIEWED

Amcan Castings
American Can of Canada Ltd.
Associated Springs Barnes Group
Beauty Industries Ltd.
Berminghammer Corporation Ltd.
Boston Insulated Wire
Bridge & Tank Company of Canada
Brown Boggs Foundry & Machine
Buntin Gillies & Company Ltd.
Burlington Steel
Canada Steamship Lines Ltd.
Canada Liquid Air Ltd.
Canadian Pittsburgh Industries
Canadian Vegetable Oil Processing
Canfor Ltd.
Canron Inc. - Foundry Division
Cities Service Chemicals
Crane Supply
Currie Products Ltd.
Denningers R. Ltd.
Design Lithographers Ltd.
Dofasco Inc.
Domglas Inc.
Domtar Chemicals Ltd.
Drug Trading Company Ltd.
Duman Ltd.
Eaton Yale Ltd. (Fasteners)
Ferrington Fabricators Ltd.
Firestone Canada Ltd.
Frank, A.J. & Son Ltd.
Frontenac Chemical Waste Services Ltd.
G.S.W. Metalwares - Building Products Division
Gencab of Canada Ltd.
George F. Pattinos (Canada)
Hall, Fred & Son Ltd.
Hamilton Wire Products Ltd.
Hanna Manufacturing Company Ltd.
Havco Foods
Hendrie & Company Ltd.
Henninger Brewery (Ontario) Ltd.
Hoffman, J. & Sons
Homer & Wilson Ltd.
Intermetco Ltd.
International Harvester Company
Ippolito Fruit & Produce Ltd.

Jervis B. Webb Company of Canada
Jocelyn, W.E. Roofing
Johnson H & R (Canada) Inc.
Kingsway Transports Ltd.
Laidlaw Transportation Ltd.
Lake Shore Sand Company
Lawson Lumber Company Ltd.
M. & T. Chemicals Ltd.
McLarens Foods Ltd.
Metal Recovery Industries Ltd.
Myers Fuels Ltd.
National Sewer Pipe Ltd.
National Slag Ltd.
National Steel Car Corporation Ltd.
Neo Industries Ltd.
Niagara Paint & Chemical Company
Norton Company of Canada Ltd.
Otis Elevator Company
Petrofina Canada Ltd.
Petruccelli, G. & Son Ltd.
Plastic & Asbestos Products Company
Procter & Gamble Company of Canada
Ray-Flo Manufacturing & Distributing Ltd.
Red-D-Mix Concrete Company
Rheem Canada Ltd.
Royal Mattress Manufacturing Company
Russelsteel Ltd.
Seaway Terminals
Shell Canada Ltd. - Thermoshell Division
Smith Transport
Stanley Steel Company Ltd.
Stanley Works of Canada Ltd.
Stanton Pipes Ltd.
Stelco Inc. - Hilton Works
- Parkdale Works
Sterling Oil Distributors
Sunoco Inc.
Susan Shoe Industries - Fortune Footwear Division
- Permalite Industries
Taylor, L.E. Associates Ltd.
Texaco Canada Inc.
Thames Valley Beverages Ltd.
Thompson Printing Company
Tresidder Reid Paper Boxes
True Temper Canada Ltd.
Union Drawn Steel Company
Universal Handling Equipment

Vallance Brown & Company Ltd.
Veribest Products Ltd.
Walmer Transport Company Ltd.
Waxman, I. & Sons Ltd.
Weaver-Liquifuels
Welco Precision Weights
Wentworth Mould & Die Company
Westinghouse Canada Ltd. - Turbine & Generator Division
- Transformer & Motor Divisions
White Supply Company Ltd.
Wilkinson & Kompass Ltd.
Xtravim Agricultural Products Ltd.

Appendix B
QUESTIONNAIRE SURVEY

CANADA PORTS PROJECT

Sponsored by York University/University of Toronto
Joint Programme in Transportation

SURVEY OF FIRMS IN HAMILTON PORT AREA

Research Supervisor: Dr. G. B. Morcliffe (667-3087)

NAME OF FIRM: _____

ADDRESS OF FIRM: _____

BASIC PROFILE

1. (a) What year was this plant established? _____

   (b) Did this company establish this plant? Yes ☐ No ☐

   ↓

   What year did this company take over this plant?_____

2. What activities are carried on in this establishment?

   _____

   _____

   _____

   _____

3. What is the total land area occupied by this establishment?

   _____ square feet or _____ acres

   breakdown:

   parking: _____%

   outside storage: _____%

   buildings: _____%

   open space: _____%

   rail sidings: _____%

   road allowance: _____%

4. What is the total floor space? _____ square feet

(i) What percent of the floor space is used for:

a) administration _____%

b) manufacturing _____%

c) inside storage _____%

(ii) Does the company have additional storage facilities?

a) adjacent to docks? Yes ☐ No ☐

If yes, where and why?

_____

_____

b) elsewhere in Hamilton? Yes ☐ No ☐

If yes, where?

_____

_____

5. Does this company have any other plants located in the Hamilton Region?

Yes ☐ No ☐

(i) How many? _____

(ii) Where are they located? _____

(iii) How do their functions differ from this plant?

_____

_____

(iv) What commodities/products are moved between this plant and your other plants?

_____

_____

6. Where is (i) your company's head office? _____

(ii) your company's regional office? _____

7. a) How many employees work throughout the year in this plant?

_____

b) Please give a breakdown for the following categories:

management _____

secretarial _____

production (shop floor) _____

shipping/receiving/storage _____

transportation _____

maintenance _____

c) Do you take on seasonal employees (e.g. summer students)?

No _____ Yes (i) How many _____

(ii) Which season _____

d) How many of your present employees spend most or all of their working day away from the site (e.g. truck drivers, salesmen)?

_____

INPUTS AND OUTPUTS

8. What are the major inputs of this establishment?

A. INPUT: _____

Sources of Input	Quantity per Year	Mode of Transport % Ship	Rail	Truck	Pipeline

B. INPUT: _____

C. INPUT: _____

D. INPUT: _____

9. What are the major products/services produced by this establishment?

A. PRODUCT/SERVICE: _____

Location of Customer (Destination)	Quantity per Year	Mode of Transport % Ship	Rail	Truck	Pipeline

B. PRODUCT/SERVICE: _____

C. PRODUCT/SERVICE: _____

D. PRODUCT/SERVICE: _____

USE OF PORT FACILITIES

10. (a) What is the length of your firm's dockwall? _____

(b) Which berths are used by your firm? _____

(c) What equipment and facilities are on your quay?

_____

_____

_____

11. Does your company have any specific reason for being located in the port area?

_____

_____

_____

_____

12. What techniques are used for loading and unloading cargo?

_____

_____

_____

_____

13. What type of vessel is used in

(a) making waterborne shipments to you? _____

(b) shipping your products elsewhere? _____

14. How many times per year do vessels

	from elsewhere on Great Lakes	up the St. Lawrence Seaway
(a) deliver to you?	_____	_____
(b) ship your products elesewhere?	_____	_____

15. Does the company have any transportation problems relating to the harbour/docking facilities? (please list)

_____

_____

OTHER TRANSPORTATION

16. On average how many heavy truck trips are made per week in

    (a) deliveries to this plant? _____

    (b) shipments from this plant? _____

17. On average, how many railway shunts are made per week in

    (a) deliveries to this plant? _____

    (b) shipments from this plant? _____

18. Does your company have any problems relating to land transportation around the port area? (road/rail/pipelines/transit/parking/loading)

    P ☐

    _____

    _____

    _____

    _____

19. Are there any specific improvements you think will alleviate these problems?

    P ☐

    _____

    _____

    _____

20. Can you estimate the number of light commercial vehicles coming to this plant each day?

    _____.

21. Can you estimate the number of your employees that commute to work each day?

    a) in their own vehicle _____

    b) in a car pool _____

    c) by public transit _____

PROBLEMS OF LOCATION

22. What were the major reasons for the original choice of this port-area location ? (please list)

P ☐

a. _____

b. _____

c. _____

d. _____

e. _____

f. _____

23. If you were choosing a site today, would you still choose this site?

Yes ☐ ↓

Why? P ☐

_____

_____

_____

No ☐ ↓

Why not? P ☐

_____

_____

_____

Where would you choose?

_____

_____

_____

24. Is the company considering expanding in the next 10 years?

Yes ☐ → (i) Where?

__ at existing site

__ elsewhere in Hamilton

__ elsewhere beyond Hamilton

(ii) Total relocation or branch plant?

_____

(iii) Why the chosen location? P ☐

_____

_____

_____

No ☐ → Why/Why not?

_____

_____

_____

_____

25. If your company currently has establishments at several locations within Canada, is it considering consolidating/rationalising the company's activities within Canada?

Yes ☐ → How? _____

_____

_____

_____

Where? _____

_____

_____

_____

No ☐

26. Do you have any other problems with the present location? If so, please list. P ☐

_____

_____

_____

_____

27. What are the advantages of your present location? P ☐

_____

_____

_____

_____

28. What is the current book value of this plant (including machinery and equipment)?

_____

END

Thank you.